10,426

Vol. 981 Number 1

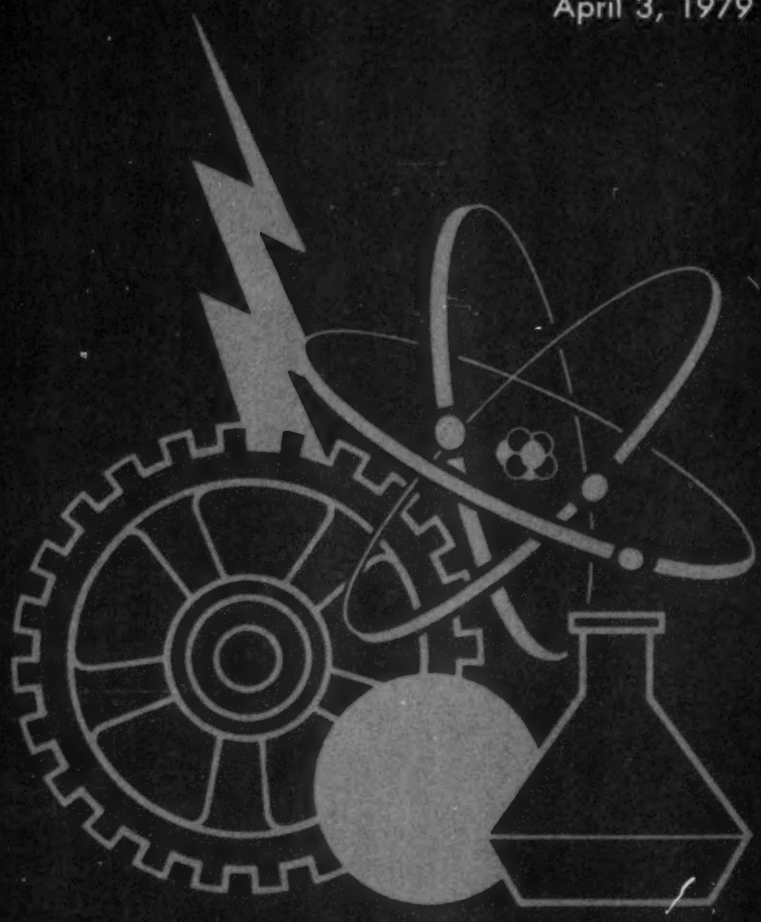
# OFFICIAL GAZETTE

of the

## UNITED STATES PATENT AND TRADEMARK OFFICE

PATENTS

April 3, 1979



U.S. DEPARTMENT OF COMMERCE

Patent and Trademark Office

PUBLISHED WEEKLY BY AUTHORITY OF CONGRESS

**UNITED STATES DEPARTMENT OF COMMERCE**
**Patent and Trademark Office**

Address : COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

## Postponement of Hearing

The Patent and Trademark Office is deferring its rulemaking proposal concerning advisory opinions on patent validity (See 978 OG 152 and 978 TMOG 148). The hearing scheduled for April 11, 1979 is postponed until further notice.

# OFFICIAL GAZETTE of the
# UNITED STATES PATENT and TRADEMARK OFFICE

April 3, 1979 Volume 981 Number 1


## CONTENTS


| | Page |
|---|---|
| Patent and Trademark Notices | |
| Patent Cooperation Treaty (PCT) Information | 981 OG 2 |
| Examination | 981 OG 2 |
| Reissue Applications Filed | 981 OG 2 |
| Patent Notices | |
| Certificates of Correction for the Week of April 3, 1979 | 981 OG 3 |
| Disclaimers | 981 OG 3 |
| Dedication | 981 OG 3 |
| Erratum | 981 OG 3 |
| Patents Available for Licensing or Sale | 981 OG 3 |
| National Technical Information Service | 981 OG 3 |
| Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries | 981 OG 6 |
| Condition of Patent Applications | 981 OG 7 |
| Defensive Publications (T981,001) | 1 |
| Reissue Patents Granted (29,949) | 3 |
| Patents Granted | |
| General and Mechanical (4,146,932) | 7 |
| Chemical (4,147,507) | 203 |
| Electrical (4,147,887) | 307 |
| Design Patents Granted (251,456) | 381 |
| Index of Patentees | PI 1 |
| Indices of Applicants of Defensive Publications, Reissues, and Designs | PI 42 |
| Classification of | |
| Patents (Including Reissues) | PI 45 |
| Designs and Defensive Publications | PI 47 |
| Geographical Index of Residence of Inventors | |
| Patents (Including Reissues) | PI 48 |
| Designs and Applicants of Defensive Publications | PI 49 |
| Change of Address Form and Subscription Order Form | Back Page |



**The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed:**

**THE OFFICIAL GAZETTE (PATENTS SECTION), issued weekly, subscription $300.00 per annum for first-class mailing, also available as fourth-class mail at $200.00; foreign first-class mailing rates will be furnished upon request; single copies each, $4.00 domestic, $5.00 foreign.**

**THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly, subscription $88.40 per annum, foreign mailing $22.10 additional; single copies $1.70 each.**

**GENERAL INFORMATION concerning TRADEMARKS, price $1.50 each.**

---

**PRINTED COPIES OF PATENTS are furnished by the Patent and Trademark Office at 50 cents each; PLANT PATENTS in color, $1.00 each; copies of TRADEMARKS AND DESIGN PATENTS at 20 cents each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.**

---

Printing authorized by Section 11(a)3 of Title 35, U.S. Code P.T.O.

# PATENT AND TRADEMARK OFFICE NOTICES

## Patent Cooperation Treaty (PCT) Information

For information concerning the PCT including the amounts of the fees thereunder and the States that may be designated in International applications consult the Notice entitled "Patent Cooperation Treaty (PCT) : Information for Prospective Applicants" appearing in the OFFICIAL GAZETTE of October 3, 1978.

DONALD W. BANNER.
Nov. 7, 1978. *Commissioner of Patents and Trademarks.*

## Examination

Pursuant to the provisions of 37 CFR 1.341(c), an examination for persons seeking registration before the United States Patent and Trademark Office as patent attorneys or agents will be held on Tuesday, October 16, 1979.

With the exception of those former examiners for whom the examination is waived, all persons recognized for practice before the Patent and Trademark Office in patent cases, must, pursuant to the noted rule, pass the examination. Those passing the examination do not thereby qualify for recognition for practice before the Patent and Trademark Office in trademark cases. Recognition for practice in trademark cases is governed by Rule 2.12 of the Trademark Rules of Practice, which does not require the passing of an examination.

The examination will be given under the supervision of the Office of Personnel Management (formerly the U.S. Civil Service Commission), and may be taken in any of the cities in which the Office of Personnel Management regularly conducts examinations. Applications to take the examination must be filed in the Patent and Trademark Office together with a $35 fee not later than July 31, 1979.

Application blanks may be obtained from the Clerk of the Patent and Trademark Office Committee on Enrollment, Bldg. 3, 11th Floor, Room C16, Crystal Plaza, Arlington, Va., or by mail addressed to the Commissioner of Patents and Trademarks, Washington, D.C. 20231, and directed to the attention of the Clerk of the Committee on Enrollment.

LUTRELLE F. PARKER,
Mar. 7, 1979. *Chairman, Committee on Enrollment.*

## REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

**D. 231,015,** Re. S.N. 933,780, Filed Aug. 14, 1978, Cl. D52/3 R, NEWSPAPER VENDING MACHINE, Jack S. Chalabian, Owner of Record: *K-Jack Engineering Co., Inc., Gardena, Calif.,* Attorney or Agent: George F. Smyth, et al., Ex. Gp.: 290

**3,867,664,** Re. S.N. 965,278, Filed Dec. 1, 1978, Cl. 313/229, ELECTRIC DISCHARGE DEVICES, Alan George Chalmers, et al., Owner of Record: *Thorn Electrical Industries Limited, London, England,* Attorney or Agent: Sewall P. Bronstein, et al., Ex. Gp.: 252

**4,000,986,** Re. S.N. 945,940, Filed Sep. 25, 1978, Cl. 44/62, ADDITIVES TO IMPROVE THE FLOW OF HEAVY FUELS AND CRUDE OILS, Edward H. Specht, et al., Owner of Record: *Rohm and Haas, Philadelphia, Pa.,* Attorney or Agent: Patrick C. Baker, et al., Ex. Gp.: 117

**4,058,961,** Re. S.N. 964,525, Filed Nov. 29, 1978, Cl. 57/34, FALSE TWIST-CRIMPING MACHINE, Hermann Kubler, Owner of Record: *Barmag Barmer Maschinenfabrik Aktiengesellschaft, Remscheid-Lennap, Germany,* Attorney or Agent: Donald M. Seltzer, et al., Ex. Gp.: 244

**4,069,749,** Re. S.N. 945,535, Filed Sep. 25, 1978, Cl. 93/58.1, EXPANSIBLE DRIVE SHAFT TOOL MECHANISM, John H. Olsen, Owner of Record: *Flow Industries, Inc., Kent, Wash.,* Attorney or Agent: Orland M. Christensen, et al., Ex. Gp.: 325

**4,099,617,** Re. S.N. 965,294, Filed Dec. 1, 1978, Cl. 206/443, SHIPPING BUNDLE FOR NUMEROUS PIPE LENGTHS, Ferdinand J. Nist, Jr., Owner of Record: *Seattle Box Company, doing business as Seattle-Tacoma Box Co., Kent, Wash.,* Attorney or Agent: Ford E. Smith, et al., Ex. Gp.: 241

**4,120,877,** Re. S.N. 972,137, Filed Dec. 21, 1978, Cl. 260/348.23, OXIDATION OF OLEFINS TO OXIRANE COMPOUNDS WITH PERIODATE COMPOUNDS, William P. Coker, et al., Owner of Record: *The Dow Chemical Company, Midland, Mich.,* Attorney or Agent: Richard G. Waterman, et al., Ex. Gp.: 121

**4,129,533,** Re. S.N. 004,017, Filed Jan. 17, 1979, Cl. 521/117, PROCESS FOR PRODUCING STABILIZED HIGH STRENGTH UREA-ALDEHYDE INSULATING FOAMS, William P. Moore Jr., Owner of Record: *Ashland Oil Inc., Ashland, Ky.,* Attorney or Agent: William Kammerer, Ex. Gp.: 141

# PATENT NOTICES

## Certificates of Correction for the Week of Apr. 3, 1979

| | | | |
|---|---|---|---|
| Re. 29,520 | 4,098,459 | 4,111,574 | 4,124,424 |
| D. 249,676 | 4,098,478 | 4,111,660 | 4,124,501 |
| D. 250,292 | 4,098,871 | 4,111,793 | 4,124,533 |
| 3,814,279 | 4,100,071 | 4,111,891 | 4,124,625 |
| 3,825,403 | 4,100,215 | 4,111,902 | 4,125,593 |
| 3,894,800 | 4,100,595 | 4,111,915 | 4,125,800 |
| 3,897,446 | 4,100,612 | 4,112,197 | 4,126,049 |
| 3,953,468 | 4,100,669 | 4,112,326 | 4,126,578 |
| 3,967,563 | 4,101,255 | 4,112,665 | 4,126,650 |
| 4,005,238 | 4,101,289 | 4,113,179 | 4,126,656 |
| 4,005,736 | 4,101,336 | 4,113,858 | 4,126,710 |
| 4,016,497 | 4,101,622 | 4,114,759 | 4,127,401 |
| 4,054,250 | 4,102,555 | 4,115,256 | 4,127,657 |
| 4,054,954 | 4,102,685 | 4,115,639 | 4,127,943 |
| 4,056,545 | 4,103,076 | 4,115,816 | 4,128,169 |
| 4,060,308 | 4,103,235 | 4,117,245 | 4,128,254 |
| 4,067,302 | 4,103,786 | 4,117,315 | 4,128,311 |
| 4,067,497 | 4,103,842 | 4,117,550 | 4,128,448 |
| 4,071,407 | 4,104,242 | 4,118,017 | 4,128,510 |
| 4,071,639 | 4,104,420 | 4,118,724 | 4,128,645 |
| 4,073,716 | 4,104,833 | 4,118,726 | 4,128,737 |
| 4,076,800 | 4,104,959 | 4,118,738 | 4,128,849 |
| 4,077,806 | 4,105,649 | 4,118,891 | 4,128,875 |
| 4,080,207 | 4,105,704 | 4,119,006 | 4,128,913 |
| 4,081,496 | 4,106,080 | 4,119,116 | 4,129,823 |
| 4,081,681 | 4,106,223 | 4,119,413 | 4,130,419 |
| 4,086,408 | 4,106,524 | 4,119,626 | 4,130,584 |
| 4,086,882 | 4,107,004 | 4,119,652 | 4,130,969 |
| 4,086,930 | 4,107,169 | 4,119,950 | 4,131,476 |
| 4,087,408 | 4,107,797 | 4,120,177 | 4,131,615 |
| 4,087,573 | 4,107,827 | 4,120,227 | 4,131,686 |
| 4,088,109 | 4,108,147 | 4,120,599 | 4,131,859 |
| 4,089,873 | 4,108,281 | 4,120,707 | 4,131,965 |
| 4,090,600 | 4,108,427 | 4,121,210 | 4,132,097 |
| 4,093,115 | 4,108,681 | 4,121,571 | 4,132,224 |
| 4,093,555 | 4,108,782 | 4,122,404 | 4,132,408 |
| 4,094,178 | 4,108,853 | 4,122,444 | 4,132,510 |
| 4,095,166 | 4,108,961 | 4,122,494 | 4,132,669 |
| 4,095,267 | 4,109,122 | 4,122,573 | 4,132,810 |
| 4,095,659 | 4,109,861 | 4,122,576 | 4,133,421 |
| 4,095,763 | 4,110,384 | 4,122,602 | 4,133,487 |
| 4,096,146 | 4,111,011 | 4,122,603 | 4,133,609 |
| 4,096,765 | 4,111,067 | 4,122,805 | 4,133,823 |
| 4,096,997 | 4,111,186 | 4,123,195 | 4,134,151 |
| 4,097,577 | 4,111,223 | 4,123,245 | 4,134,708 |
| 4,097,598 | 4,111,299 | 4,123,270 | 4,134,816 |
| 4,097,606 | 4,111,341 | 4,123,416 | 4,135,098 |
| 4,097,912 | 4,111,362 | 4,123,442 | 4,135,104 |
| 4,098,013 | 4,111,420 | 4,123,488 | 4,135,155 |
| 4,098,390 | 4,111,507 | 4,123,753 | |

## Disclaimers

3,984,047.—*William J. Clayton*, Fairport, *Robert H. Olson*, Pittsford, and *Donld Kutniewski*, Macedon, N.Y. REINFORCED THIN WALL PLASTIC BAG. Patent dated Oct. 5, 1976. Disclaimer filed Dec. 20, 1978 by the assignee, *Mobil Oil Corporation*.

Hereby enters this disclaimer to all claims of said patent.

4,044,285.—*Allan Barr Plunkett* and *John Douglas D'Atre*, Erie, Pa. METHOD AND APPARATUS FOR CONTROLLING VARIABLE SPEED, CONTROLLED CURRENT INDUCTION MOTOR DRIVE SYSTEMS. Patent dated Aug. 23, 1977. Disclaimer filed Jan. 8, 1979 by the assignee, *General Electric Company*.

Hereby enters this disclaimer to claims 1, 2, 3, 16, 31 and 32 of said patent.

4,054,708.—*William A. Robba*, Boulder, Colo. and *Robert W. Froberg*, Easton, Pa. FILM OF PYROLYTIC GRAPHITE HAVING BI-DIRECTIONAL REINFORCING PROPERTIES. Patent dated Oct. 18, 1977. Disclaimer filed Jan. 4, 1979 by the assignee, *Pfizer Inc.*

Hereby enter this disclaimer to claims 1 and 2 of said patent.

4,085,052.—*Alan Pearce Murphy* and *Paul Seiden*, Cincinnati, *Francis Louraine Diehl*, Wyoming, and *Charles Bruce McCarty*, Cincinnati, Ohio. FABRIC TREATMENT COMPOSITIONS. Patent dated Apr. 18, 1978. Disclaimer filed Jan. 12, 1979, by the assignee, *The Procter & Gamble Company*.

Hereby enters this disclaimer to claims 1 through 18 of said patent.

4,117,186.—*Charles P. O'Farrell*, Clark, *Paul L. Malloy*, Westfield, and *Francis M. Thompson*, White House Station, N.J. BUTYL/RESIN BLEND LATEX USED TO COAT POLYPROPYLENE FABRICS. Patent dated Sept. 26, 1978. Disclaimer filed Dec. 18, 1978 by the assignee, *Exxon Research and Engineering Company*.

Hereby enters this disclaimer to claims 1, 2 and 3 of said patent.

## Dedication

3,923,301—*Dwight L. Myers*, Mocksville, N.C. AMUSEMENT WATER SLIDE AND METHOD. Patent dated Dec. 2, 1975. Dedication filed Feb. 5, 1979 by the assignee, *Water-Boggan International Inc.*

Hereby dedicates to the Public the entire remaining term of said patent.

## Erratum

All reference to Patent No. 4,117,506 to David Emil Carlson et al., Amorphous Silicon Photovoltaic Device Having an Insulating Layer, appearing in the OFFICIAL GAZETTE of November 7, 1978 should be deleted as the patent was, in fact, granted.

## Patents Available for Licensing or Sale

3,483,660. CORN HARVESTER (Curved & Straight) Blade Grinding Machine. Charlie Harris, 801 Southwest St., Culpepper, Va. 22701.

4,108,083. PORTABLE WRITING AND READING TABLE ASSEMBLY. Albert Espinosa, 838 Riverside Drive, New York, N.Y. 10032.

4,121,061. TELEPHONE HOLDER. Robert G. Donaldson, 3101 N. Sheridan Road, Apt. 1204, Chicago, Ill. 60657.

4,136,902. SHOWER SOAP RETRIEVER. Donald L. Leonard, P.O. Box 305, Cornell, Ill. 61319.

## National Technical Information Service

GOVERNMENT-OWNED INVENTIONS

*Notice of Availability for Licensing*

The inventions listed below are owned by the U.S. Government and are available for domestic and possibly foreign licensing in accordance with the licensing policies of the agency-sponsors.

Copies of the patents cited are available from the Commissioner of Patents and Trademarks, Washington, D.C. 20231, for $.50 each. Requests for copies of patents must include the patent number.

Copies of the patent applications can be purchased from the National Technical Information Service (NTIS), Springfield, Va. 22161 for $4.00 ($8.00 outside North American Continent). Requests for copies of patent applications must include the patent application number. Claims are deleted from

patent application copies sold to the public to avoid premature disclosure in the event of an interference before the Patent and Trademark Office. Claims and other technical data will usually be made available to serious prospective licensees by the agency which filed the case.

Requests for licensing information on a particular invention should be directed to the address cited for the agency-sponsor.

DOUGLAS J. CAMPION,
*Patent Program Coordinator,*
*National Technical Information Service.*

U.S. DEPARTMENT OF AGRICULTURE

Research Agreements and Patent Branch, General Service Division, Federal Bldg., Agricultural Research Service Hyattsville, Md. 20782

Patent application 934,289. Process for In Vivo Transfer of Cell-Mediated Immunity in Mammals With Alcoholic Precipitates of Bovine Transfer Factor. Filed Aug. 17, 1978.

Patent 4,090,456. Furrow Opener and Apparatus for No-Tillage Transplanters and Planters. Filed Oct. 2, 1975. Patented May 23, 1978. Not available NTIS.

U.S. DEPARTMENT OF ENERGY

Assistant General Counsel for Patents Washington, D.C. 20545

Patent 4,080,960. Ultrasonic Technique for Characterizing Skin Burns. Filed Nov. 4, 1976. Patented Mar. 28, 1978. Not available NTIS.

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

National Institutes of Health, Chief, Patent Branch Westwood Bldg., Bethesda, Md. 20014

Patent application 945,130. Hemoglobin-Oxygen Equilibrium Curve Analyzer. Filed Sept. 25, 1978.

U.S. DEPARTMENT OF THE NAVY

Assistant Chief for Patents, Office of Naval Research Code–302, Arlington, Va. 22217

Patent application 883,752. Control Manifold. Filed Mar. 6, 1978.

Patent application 916,413. Dual Loading and Stowage Apparatus. Filed June 16, 1978.

Patent application 918,133. High Electrical Frequency Infrared Detector. Filed June 22, 1978.

Patent application 918,241. Isochronous Cyclotron. Filed June 23, 1978.

Patent application 924,461. Combination Acoustic Filter Plate and Liquid Lens. Filed July 14, 1978.

Patent application 936,541. Flexible Co-Axial Connector for Cable In-Line Electronics. Filed Aug. 23, 1978.

Patent application 937,281. Process for the Preparation of 1,3,5-Trifluoro-2,4,6-Trinitrobenzene. Filed Aug. 28, 1978.

Patent application 939,734. Folded Tapered Coaxial Cavity-Backed Annular Slot Antenna. Filed Sept. 5, 1978.

Patent application 939,735. Inflatable Cavity-Backed Annular Slot Transmitting Antenna. Filed Sept. 5, 1978.

Patent application 941,535. Process and Device for Desalinating Water. Filed Sept. 11, 1978.

Patent application 941,702. Infrared Suppressor Device. Filed Sept. 12, 1978.

Patent application 943,885. Inflight, Stores Forces and Moments Measuring Device. Filed Sept. 19, 1978.

Patent application 943,886. Variable Force Control System for Weapon Ejection Mechanisms. Filed Sept. 19, 1978.

Patent application 944,667. High Range Resolution Radar Rate Aided Range Tracker. Filed Sept. 22, 1978.

Patent application 945,989. Pulse Width Modulated Power Amplifier for Direct Current Motor Control. Filed Sept. 26, 1978.

Patent application 946,679. Low-Frequency Directional Hydrophone. Filed Sept. 28, 1978.

Patent 4,089,797. Chemiluminescent Warning Capsules. Filed Mar. 21, 1977. Patented May 16, 1978. Not available NTIS.

Patent 4,092,701. Ultra High Input Impedance/Voltage Range Amplifier. Filed Dec. 8, 1976. Patented May 30, 1978. Not available NTIS.

Patent 4,094,710. Explosive Composition Containing Guanidinium Picrate. Filed Aug. 16, 1973. Patented June 13, 1978. Not available NTIS.

Patent 4,096,479. Radar Significant Target. Filed Apr. 14, 1977. Patented June 20, 1978. Not available NTIS.

Patent 4,097,294. Preparation of Ceramics. Filed Aug. 23, 1976. Patented June 27, 1978. Not available NTIS.

Patent 4,097,749. Fourier Power Spectro of Optical Images Using CCD's. Filed Jan. 6, 1977. Patented June 27, 1978. Not available NTIS.

Patent 4,097,865. Electronic Countermeasure Sequence Timer. Filed June 1, 1971. Patented June 27, 1978. Not available NTIS.

Patent 4,098,625. Explosive Compositions Bonded With Fluorocarbon Polymers. Filed May 8, 1968. Patented July 4, 1978. Not available NTIS.

Patent 4,098,633. Method of Making Radiation Seal. Filed Jan. 24, 1977. Patented July 4, 1978. Not available NTIS.

Patent 4,099,148. Transversal Filter Prime Sequence Frequency Synthesizer. Filed May 2, 1977. Patented July 4, 1978. Not available NTIS.

Patent 4,099,465. Ignition Device for Missile Motors. Filed Dec. 17, 1976. Patented July 11, 1978. Not available NTIS.

Patent 4,099,466. Trajectory Adaptive Safety-Arming Device. Filed May 5, 1977. Patented July 11, 1978. Not available NTIS.

Patent 4,099,854. Optical Notch Filter Utilizing Electric Dipole Resonance Absorption. Filed Oct. 12, 1976. Patented July 11, 1978. Not available NTIS.

Patent 4,100,498. Discrete Chirp Frequency Synthesizer. Filed June 20, 1977. Patented July 11, 1978. Not available NTIS.

Patent 4,100,609. Magnetoresistance Detector for Crosstie Memories. Filed Sept. 3, 1976. Patented July 11, 1978. Not available NTIS.

Patent 4,101,099. Repeatable Release Holdback Bar. Filed Sept. 15, 1977. Patented July 18, 1978. Not available NTIS.

Patent 4,101,352. Deflagrative Electronic Component Potting Compound. Filed Feb. 8, 1971. Patented July 18, 1978. Not available NTIS.

Patent 4,101,800. Controlled-Porosity Dispenser Cathode. Filed July 6, 1977. Patented July 18, 1978. Not available NTIS.

Patent 4,101,839. Analog-Digital Ratio Detector. Filed Nov. 27, 1974. Patented July 18, 1978. Not available NTIS.

Patent 4,101,893. Aircraft Landing Aid for Zero-Zero Visibility Landings. Filed Aug. 5, 1977. Patented July 18, 1978. Not available NTIS.

Patent 4,102,953. Method for Making Extruded, Solventless, Composite-Modified Double Base Propellant. Filed May 25, 1976. Patented July 25, 1978. Not available NTIS.

Patent 4,103,251. Stabilized Delay Line Oscillator. Filed May 5, 1977. Patented July 25, 1978. Not available NTIS.

Patent 4,103,279. Diver Navigation System. Filed July 25, 1977. Patented July 25, 1978. Not available NTIS.

Patent 4,104,607. Zero Temperature Coefficient of Resistance Bi-Film Resistor. Filed Mar. 14, 1977. Patented Aug. 1, 1978. Not available NTIS.

Patent 4,104,708. Shrouded Chemical Light Sources. Filed July 8, 1974. Patented Aug. 1, 1978. Not available NTIS.

Patent 4,104,719. Multi-Access Memory Module for Data Processing Systems. Filed May 20, 1976. Patented Aug. 1, 1978. Not available NTIS.

Patent 4,112,699. Heat Transfer System Using Thermally-Operated, Heat-Conducting Valves. Filed May 4, 1977. Patented Sept. 12, 1978. Not available NTIS.

Patent 4,113,646. Air Revitalization Compositions. Filed Apr. 25, 1977. Patented Sept. 12, 1978. Not available NTIS.

Patent 4,114,135. Acoustic Device. Filed June 20, 1975. Patented Sept. 12, 1978. Not available NTIS.

Patent 4,114,189. Digital Signal Synthesis System. Filed Dec. 9, 1975. Patented Sept. 12, 1978. Not available NTIS.

Patent 4,116,153. Elastic Electrically-Conductive Strain Cable. Filed Apr. 4, 1977. Patented Sept. 26, 1978. Not available NTIS.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Assistant General Counsel for Patent Matters NASA—Code GP–2, Washington, D.C. 20546

Patent 4,102,580. System for the Measurement of Ultra-Low Stray Light Levels. Filed Dec. 29, 1976. Patented July 25, 1978. Not available NTIS.

Patent 4,103,619. Electroexplosive Device. Filed Nov. 8, 1976. Patented Aug. 1, 1978. Not available NTIS.

Patent 4,104,134. Method for Making an Aluminum or Copper Substrate Panel for Selective Absorption of Solar Energy. Filed Aug. 31, 1977. Patented Aug. 1, 1978. Not available NTIS.

Patent 4,104,873. Fuel Delivery System Including Heat Exchanger Means. Filed Nov. 29, 1976. Patented Aug. 8, 1978. Not available NTIS.

Patent 4,105,966. Remote Lightning Monitor System. Filed Mar. 29, 1977. Patented Aug. 8, 1978. Not available NTIS.

Patent 4,121,965. Method of Controlling Defect Orientation in Silicon Crystal Ribbon Growth. Filed July 16, 1976. Patented Oct. 24, 1978. Not available NTIS.

Patent 4,121,995. Surfactant-Assisted Liquefaction of Particulate Carbonaceous Substances. Patented Oct. 24, 1978. Not available NTIS.

Patent 4,122,816. Plasma Igniter for Internal Combustion Engine. Filed Apr. 1, 1976. Patented Oct. 31, 1978. Not available NTIS.

Patent 4,122,833. Non-Tracking Solar Energy Collector System. Filed May 27, 1977. Patented Oct. 31, 1978. Not available NTIS.

Patent 4,122,991. Apparatus for Assembling Space Structure. Filed Aug. 31, 1977. Patented Oct. 31, 1978. Not available NTIS.

U.S. DEPARTMENT OF AGRICULTURE

Research Agreements and Patent Branch, General Service Division, Federal Bldg., Agricultural Research Service Hyattsville, Md. 20782

Patent application 925,136. Method for Apparatus for Verifying Declared Contents of Certain Solids. Filed July 17, 1978.

Patent application 936,462. N-(3-Alkylamidropyl)-N,N-Dimethyl-N-(P-Sulfobenzyl) Ammonium Inner Salts. Filed Aug. 24, 1978.

Patent application 944,678. Differential Action Extractor Comb. Filed Sept. 22, 1978.

Patent 4,077,196. Fiber Dispersing and Feeding Apparatus for Open End Spinning. Filed Nov. 2, 1976. Patented Mar. 7, 1978. Not available NTIS.

Patent 4,080,480. Catalyzing Cellulosic Textile Finishing Processes With Phosphonic Acid Derivatives. Filed June 9, 1976. Patented Mar. 21, 1978. Not available NTIS.

Patent 4,082,500. Process for Imparting Wrinkle Recovery to Cotton Fabrics With Vapors From Glycidol. Filed May 6, 1977. Patented Apr. 4, 1978. Not available NTIS.

Patent 4,084,027. Process for Imparting Durable Flame-Retardancy to Cotton-Polyester Blended Textiles. Filed May 6, 1977. Patented Apr. 11, 1978. Not available NTIS.

Patent 4,086,385. Flame Retarded Textiles Via Deposition of Polymers From Oligomeric Vinylphosphonate and Polyamino Compounds. Filed Nov. 5, 1975. Patented Apr. 25, 1978. Not available NTIS.

Patent 4,088,443. Aluminum Chlorhydroxide-Phosphoric Acid Catalyst System for Flash Cure Treatments To Give Improved Durable-Press Properties in Cellulose Containing Textiles. Filed Feb. 6, 1976. Patented May 9, 1978. Not available NTIS.

Patent 4,090,844. Process of Producing High Performance Durable-Press Cotton. Filed June 23, 1977. Patented May 23, 1978. Not available NTIS.

Patent 4,092,106. Emulsion Systems for Imparting Durable Press Properties to Cotton and Cotton-Polyester Blended Textiles. Filed Sept. 22, 1976. Patented May 30, 1978. Not available NTIS.

Patent 4,105,403. Knitted Cotton Fabric Durably Patterned by Differential Shrinkage. Filed May 7, 1976. Patented Aug. 8, 1978. Not available NTIS.

U.S. DEPARTMENT OF TRANSPORTATION

Patent Counsel, 400 7th St. SW., Washington, D.C. 20590

Patent application 962,239. An Optical Track Gage Measuring Device. Filed Nov. 20, 1978.

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

National Institutes of Health, Chief, Patent Branch Westwood Bldg., Bethesda, Md. 20014

Patent application 900,275. Synthesis of 4a-Aryldecahydroisoquinolines. Filed Apr. 28, 1978.

Patent application 926,753. Treatment of Herpes Simplex Encephalities. Filed July 21, 1978.

Patent application 928,252. 7-O-(2,6-Dideoxy-Alpha-L-Lyxo-Hexopyranosyl)-Daunomycinone, Desmethoxy Daunomycinone, Adriamycinone, and Carminomycinone. Filed July 26, 1978.

Patent application 939,706. 4a-Aryl-Decahydrosioquinolines. Filed Sept. 5, 1978.

U.S. DEPARTMENT OF THE INTERIOR

Branch of Patents, 18 and C Sts. NW. Washington, D.C. 20240

Patent application 915,104. Preparation of Hydrosulfides. Filed June 13, 1978.

U.S. DEPARTMENT OF THE NAVY

Assistant Chief for Patents, Office of Naval Research Code-302, Arlington, Va. 22217

Patent application 937,646. Electrostatic Charge Generator. Filed Aug. 28, 1978.

Patent 4,089,797. Chemiluminescent Warning Capsules. Filed Mar. 21, 1977. Patented May 16, 1978. Not available NTIS.

Patent 4,099,931. High Density Liquid Ramjet Fuel. Filed Oct. 2, 1972. Patented July 11, 1978. Not available NTIS.

Patent 4,113,646. Air Revitalization Compositions. Filed Apr. 25, 1977. Patented Sept. 12, 1978. Not available NTIS.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Assistant General Counsel for Patent Matters NASA—Code GP-2, Washington, D.C. 20546

Patent application 961,832. Self-Stabilizing Radial Face Seal. Filed Nov. 17, 1978.

Patent application 961,833. An Improved Suspension System for a Wheel Rolling on a Flat Track. Filed Nov. 17, 1978.

Patent 4,119,996. Complementary DMOS-VMOS Integrated Circuit Structure. Filed July 20, 1977. Patented Oct. 10, 1978. Not available NTIS.

Patent 4,122,518. Automated Clinical System for Chromosome Analysis. Filed May 17, 1976. Patented Oct. 24, 1978. Not available NTIS.

Patent 4,124,732. Thermal Insulation Attaching Means. Filed Apr. 12 ,1977. Patented Nov. 7, 1978. Not available NTIS.

## Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries

The libraries listed herein, designated as patent depository libraries, receive current issues of U.S. Patents and maintain collections of earlier issued patents. The scope of these collections varies from library to library, ranging from patents of only recent months or years in some libraries to all or most of the patents issued since 1870, or earlier, in other libraries.

These patent collections are open to public use and each of the patent depository libraries, in addition, offers the publications of the patent classification system (e.g. The Manual of Classification, Index to the U.S. Patent Classification, Classification Definitions, etc.) and provides technical staff assistance in their use to aid the public in gaining effective access to information contained in patents. With one exception, as noted in the table following, the collections are organized in patent number sequence.

Depending upon the library, the patents may be available in microfilm, in bound volumes of paper copies, or in some combination of both. Facilities for making paper copies from either microfilm in reader-printers or from the bound volumes in paper-to-paper copies are generally provided for a fee.

Owing to variations in the scope of patent collections among the patent depository libraries and in their hours of service to the public, anyone contemplating use of the patents at a particular library is advised to contact that library, in advance, about its collection and hours, so as to avert possible inconvenience.

| *State* | *Name of Library* | *Telephone Contact* |
|---|---|---|
| Alabama | Birmingham Public Library | (205) 254-2555 |
| California | Los Angeles Public Library | (213) 626-7555 Ext. 274 |
| | Sunnyvale Patent Library* | (408) 736-0795 |
| Colorado | Denver Public Library | (303) 573-5152 Ext. 223 |
| Georgia | Atlanta: Price Gilbert Memorial Library, Georgia Institute of Technology | (404) 894-4519 |
| Illinois | Chicago Public Library | (312) 269-2814 |
| Massachusetts | Boston Public Library | (617) 536-5400 Ext. 265 |
| Michigan | Detroit Public Library | (313) 833-1458 |
| Missouri | Kansas City: Linda Hall Library | (816) 363-4600 |
| | St. Louis Public Library | (314) 241-2288 Ext. 214 |
| Nebraska | Lincoln: University of Nebraska-Lincoln, Love Library | (404) 472-3411 |
| New Jersey | Newark Public Library | (201) 733-7740 |
| New York | Albany: New York State Library | (518) 474-5125 |
| | Buffalo and Erie County Public Library | (716) 856-7525 Ext. 267 |
| | New York Public Library (The Research Libraries) | (212) 790-6291 |
| North Carolina | Raleigh: D. H. Hill Library, N.C. State University | (919) 737-3280 |
| Ohio | Cincinnati & Hamilton County Public Library | (513) 369-6969 |
| | Cleveland Public Library | (216) 623-2932 |
| | Columbus: Ohio State University Libraries | (614) 422-6286 |
| | Toledo/Lucas County Public Library | (419) 242-7361 Ext. 258 |
| Oklahoma | Stillwater: Oklahoma State University Library | (405) 624-6546 |
| Pennsylvania | Philadelphia: Franklin Institute Library | (215) 448-1226 |
| | Pittsburgh: Carnegie Library of Pittsburgh | (412) 622-3128 |
| Rhode Island | Providence Public Library | (401) 521-7722 Ext. 224 |
| Texas | Dallas Public Library | (214) 748-9071 |
| | Houston: The Fondren Library, Rice University | (713) 527-8101 Ext. 2587 |
| Washington | Seattle: Engineering Library, University of Washington | (206) 543-0740 |
| Wisconsin | Madison: Kurt F. Wendt Engineering Library, University of Wisconsin | (608) 262-6845 |
| | Milwaukee Public Library | (414) 278-3043 |

*Collection organized by subject matter.

# PATENT EXAMINING CORPS

**RENE D. TEGTMEYER, Assistant Commissioner**

**WILLIAM FELDMAN, Deputy Assistant Commissioner**

## CONDITION OF PATENT APPLICATIONS AS OF MARCH 10, 1979

| PATENT EXAMINING GROUPS | Actual Filing Date of Oldest New Case Awaiting Action |
|---|---|
| **CHEMICAL EXAMINING GROUPS** | |
| GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metallurgical Apparatus; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices. | 7-7-78 |
| GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides. | 12-16-77 |
| HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, Treating Processes, and Apparatus Therefor; Irradiation (Part); Bleaching; Dyeing; Leather, Fur and Textile Treating Compositions. | 5-15-78 |
| COATING, LAMINATING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes, Apparatus and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; and Photography. | 1-23-78 |
| SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes. | 11-28-77 |
| **ELECTRICAL EXAMINING GROUPS** | |
| INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Horology; Acoustics; Recorders; Weighing Scales. | 10-12-77 |
| SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Lubrication; Illumination; Nuclear and Reactors; Radar; Directional Radio; Torpedoes; Seismic Exploring; Cathode Ray Tube Circuitry; Cryptograph; Laser Devices; Radioactive Materials; Power Metallurgy, Rocket Fuels. | 10-26-77 |
| INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—N. ANSHER, Director. Communications; Multiplexing Techniques; Television; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts. | 5-26-78 |
| RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—A. L. SMITH, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating. | 7-26-78 |
| ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring. | 8-1-77 |
| DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts. | 5-2-77 |
| **MECHANICAL EXAMINING GROUPS** | |
| HANDLING AND TRANSPORTING MEDIA, GROUP 310—M. M. NEWMAN, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment. | 1-18-78 |
| MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion-Bonding, Metal Founding; Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks; Fishing, Etc.; Butchering; and Books and Printed Matter. | 5-1-78 |
| AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—B. R. GRAY, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Plants; Harvesting; Earth Working and Excavating; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Information Dissemination. | 2-17-78 |
| HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—D. J. STOCKING, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings: Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication. | 12-2-77 |
| GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—G. M. FORLENZA, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Textiles; Apparel and Shoes; Sewing Machines; Machine Elements; Clutches. | 11-2-77 |

**Expiration of patents:** The patents within the range of numbers indicated below expire during March 1979, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 3,023,412 to 3,027,557, inclusive
Plant Patents..... Numbers 2,133 to 2,134, inclusive

# DEFENSIVE PUBLICATIONS

## PUBLISHED APRIL 3, 1979

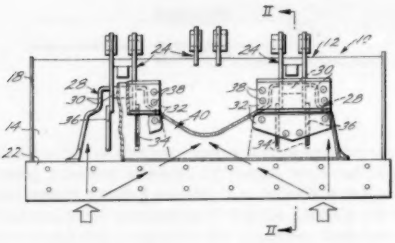
Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O.G. 687. The abstracts of Defensive Publication applications are identified by distinctly numbered series and are arranged chronologically. The heading of each abstract indicates the number of pages of specification, including claims and sheets of drawings contained in the application as originally filed. The files of these applications are available to the public for inspection and reproduction may be purchased for 30 cents a sheet.

Defensive Publication applications have not been examined as to the merits of alleged invention. The Patent and Trademark Office makes no assertion as to the novelty of the disclosed subject matter.

### T981,001
### BUCKET REINFORCING STRUCTURE

**Charles P. McReynolds, Aurora, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.**

**Filed Aug. 14, 1978, Ser. No. 933,313**
**Int. Cl.[2] E02F *3/00***
**U.S. Cl. 37—118 R**
**2 Sheets Drawing. 5 Pages Specification**



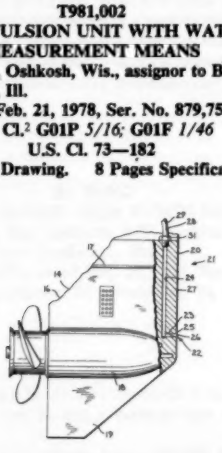
A material handling bucket structure has a shell, a blade connected to the shell and spaced apart mounting brackets having reinforcing structure and a supporting member. The supporting member extends between and connects the mounting brackets and forms a unitary portion of each bracket. The particular configuration of the supporting member effectively transfers and distributes forces applied to the blade between the mounting brackets and the shell.

---

### T981,002
### MARINE PROPULSION UNIT WITH WATER SPEED MEASUREMENT MEANS

**Richard H. Snyder, Oshkosh, Wis., assignor to Brunswick Corporation, Skokie, Ill.**

**Filed Feb. 21, 1978, Ser. No. 879,750**
**Int. Cl.[2] G01P *5/16*; G01F *1/46***
**U.S. Cl. 73—182**
**1 Sheets Drawing. 8 Pages Specification**



A marine propulsion drive unit which includes a speed measurement indicator. The speed measurement indicator is operatively connected to a pitot tube **22** within the lower gear unit **14** of the marine propulsion drive. The opening of the pitot tube **22** being in the leading edge **27** of the lower gear unit **14** at an elevation below the cavitation plate **17**. This opening is formed by a blind horizontal passageway **23** extending from the leading edge **27**. The horizontal passageway **23** intersects a blind vertical passageway **24** which is connected by tubing **29** to the speed measurement indicator.

---

### T981,003
### FILLED, BIAXIALLY ORIENTED, THERMOPLASTIC FILM HAVING PREFERENTIAL SHRINKAGE AND METHOD OF MAKING SUCH FILM

**Lester R. Bartron; Samuel P. Anderson, and Rudolph H. Michel, all of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Continuation of Ser. No. 882,983, Mar. 3, 1978, abandoned, which is a continuation of Ser. No. 743,675, Nov. 22, 1976, abandoned which is a continuation-in-part of Ser. No. 633,542, Nov. 19, 1975.**
**Filed Jul. 11, 1978, Ser. No. 923,569**
**Int. Cl.[2] C08J *9/00***
**U.S. Cl. 264—210 R**
**No Drawing. 30 Pages Specification**

A filled, biaxially oriented, void-containing thermoplastic film suitable for making heat-shrinkable bands is provided having shrinkage on heating to 100° C. of greater than 5%, which shrinkage in turn is at least 5% greater than the shrinkage in a direction perpendicular thereto.

A process for preparing this film with its preferential shrinkage is provided including the steps of:

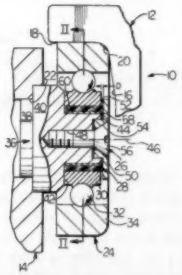
(a) melt-blending a $C_2$-$C_{10}$ $\alpha$-monoolefin polymer and at least 20 weight percent inert filler, based on the total weight of polymer and filler;
(b) forming a film from the melt blend;
(c) cooling the film to a temperature below the melting point;
(d) biaxially stretching the film at least about twice its original forming dimensions in mutually perpendicular directions while the film temperature is above the line-drawing temperature and below the polymer melting temperature, until the film has at least about 30% voids;
(e) cooling the film to room temperature; and
(f) post-stretching the biaxially stretched film in a selected direction at a temperature below 100° C. to an extent that provides the above-mentioned preferential shrinkage in the filled film.

---

### T981,004
### RESILIENTLY MOUNTED WHEEL ASSEMBLY

**Robert T. McNeely, and Michael A. Roussin, both of Peoria, Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.**

**Filed Apr. 10, 1978, Ser. No. 894,676**
**Int. Cl.[2] F16C *27/06***
**U.S. Cl. 308—26**
**1 Sheets Drawing. 13 Pages Specification**



A resiliently mounted wheel assembly has a tread ring, an

annular member, a plurality of bearing elements for rotatably mounting the tread ring on the annular member, an elastomeric ring member resiliently supporting the annular member, and an arbor mount supporting the elastomeric ring member and being of a construction sufficient for movement of the annular member between two positions spaced a preselected axial distance apart and allowing the tread ring to self-alignably engage a surface.

# REISSUES

## APRIL 3, 1979

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

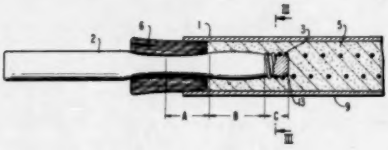
### Re. 29,949
### METHOD OF CONSTRUCTING BILATERAL HEATER UNIT

**John W. Churchill, 12 Winthrop Ave., Beverly, Mass. 01915**

**Original No. 3,934,333, dated Jan. 27, 1976, Ser. No. 527,186, Nov. 26, 1974. Division of Ser. No. 382,295, Jul. 25, 1973, Pat. No. 3,982,099. Application for reissue Nov. 23, 1977, Ser. No. 854,058**

**Int. Cl.[2] H05B** *3/00*

**U.S. Cl. 29—611** **16 Claims**



1. A method of forming a heater unit comprising the steps of forming a resistor assembly by placing each end of an elongated resistor [helix] *member* over respective end portions of cylindrical metal terminals such that the [helix] *resistor member* is detachably secured to the respective terminals and extends therebetween, arranging the resistor assembly in a metal tubular sheath such that the assembly extends in the longitudinal direction of the sheath, filling the sheath with granulated powdered insulating material, capping the ends of the tubular sheath with end plugs which are sized for a slide fit into the sheath and a slide fit around the cylindrical terminals which extend through the plugs, and deforming the tubular sheath over the entire length thereof to compact the powdered insulating material such that the end plugs and the metal terminals are deformed to a shape corresponding to the shape of the sheath in the region of the end plugs and metal terminals with the end plugs and terminals becoming lockingly secured within the sheath, at least a portion of the sheath in the region of the end plugs together with at least a portion of the end plugs and the metal terminals thereat being deformed out of round.

---

### Re. 29,950
### PUNCHING DEVICE WITH PUNCH RETAINER

**Kenneth J. Bartha, East Amherst, N.Y., assignor to Houdaille Industries, Inc., Fort Lauderdale, Fla.**

**Original No. 3,958,476, dated May 25, 1976, Ser. No. 591,888, Jun. 30, 1975. Application for reissue Dec. 14, 1977, Ser. No. 860,398**

**Int. Cl.[2] B26F** *1/06*

**U.S. Cl. 83—140** **18 Claims**

1. A punch device comprising:

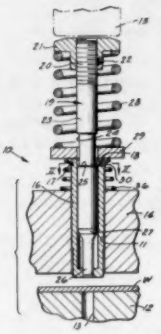
a. a frame having a lower arm on which a die is supported, and an upper arm having a vertical bore aligned therewith;

b. a punch guide and stripper sleeve slidably disposed in the bore in said upper arm, there being a groove extending circumferentially in said sleeve, and a radial aperture through said sleeve at said groove;

c. a punch having a body slidably disposed in said sleeve, said body having an elongated recess in registration with said radial aperture;

d. a stripping spring acting between said sleeve and said punch to urge the lower end of said punch into said sleeve;

e. a lifting spring acting between said sleeve and said upper arm and urging said sleeve away from said die; and



f. a retainer member disposed in said groove and having a portion projecting radially through said radial aperture into said elongated recess in said punch body.

---

### Re. 29,951
### BIGHT STOP MECHANISM FOR SEWING MACHINES

**Robert H. Larsen, Middletown, and Philip F. Minalga, Piscataway, both of N.J., assignors to The Singer Company, New York, N.Y.**

**Original No. 4,055,130, dated Oct. 25, 1977, Ser. No. 658,641, Feb. 17, 1976. Application for reissue Apr. 5, 1978, Ser. No. 893,556**

**Int. Cl.[2] D05B** *3/02, 1/08*

**U.S. Cl. 112—158 E** **7 Claims**

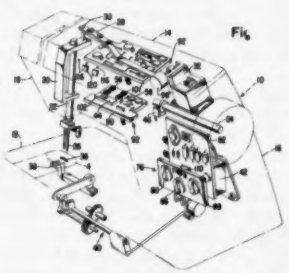
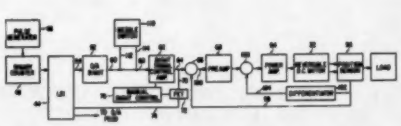


Fig. 6



6. In a sewing machine having a needle bar disposed for endwise reciprocation, said needle bar being adapted for supporting one or more needles for reciprocation therewith, jogging means responsive to electrical input signals for initiating lateral movement of said needle bar to produce patterned stitches with the magnitude of lateral movement of said needle bar being proportional to the magnitude of the electric input

signals, pattern control means including first circuit means operative for supplying electrical input signals of predetermined magnitude to said jogging means, and circuit means in addition to said first circuit means and including switch means operatively connected to said pattern control means, said switch means being adapted for operation when more than one needle is supported by said needle bar for reducing the predetermined magnitude of the electrical input signals a fixed percentage of its original value supplied by said pattern control means.

---

**Re. 29,952**

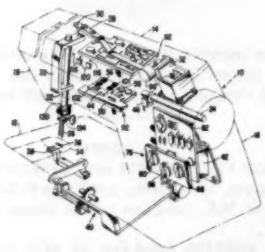
## BIGHT STOP MECHANISM FOR SEWING MACHINES

**Charles R. Odermann, Montville; Wesley R. Peterson, Bound Brook; John A. Herr, Garwood, and Oswald M. Porter, Livingston, all of N.J., assignors to The Singer Company, New York, N.Y.**

**Original No. 4,048,932, dated Sep. 20, 1977, Ser. No. 658,632, Feb. 17, 1976. Application for reissue Apr. 13, 1978, Ser. No. 895,845**

**Int. Cl.[2] D05B *3/02***

**U.S. Cl. 112—158 E** **5 Claims**



1. In a sewing machine including a housing, an endwise reciprocable needle bar means and needle means removably supported in said needle bar means for movement therewith, jogging means for initiating relative lateral movement of said needle bar means, electric motor means operatively connected to said jogging means such that initiation of the relative lateral movement of said needle bar means is controlled in accordance with movement of said electric motor means, means for generating electrical input signals in accordance with predetermined stitches in a plurality of selected patterns and for connecting said electrical input signals to said electric motor means, said electric motor means having a work output proportional to said electric input signals, and circuit means including switch means for limiting the magnitude of the electrical input signals to said electric motor means, said circuit means being operative for reducing said electrical input signals a fixed percentage each time said switch is actuated whereby upon actuation of said switch means the maximum extent of lateral movement of said needle bar means for any selected pattern will be limited and means responsive to the insertion of a needle means in said needle bar means for automatically actuating said switch means.

---

**Re. 29,953**

## APPARATUS FOR SUPPORTING AND POSITIONING OF A WORK-PIECE DURING WELDING

**Bobby R. Wilson, 423 Kline Ave., Akron, Ohio 44305**

**Original No. 3,926,422, dated Dec. 16, 1975, Ser. No. 515,224, Oct. 16, 1974. Application for reissue Dec. 15, 1977, Ser. No. 861,100**

**Int. Cl.[2] B23Q *3/18***

**U.S. Cl. 269—60** **10 Claims**

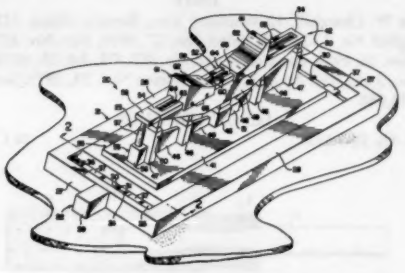
*2. Apparatus for supporting and positioning of a work-piece during welding, comprising:*

*a base plate;*

*a secondary plate carried by said base plate;*

*transverse drive means interconnected between said base and secondary plates causing relative positional movement between said plates;*

*a vertically adjustable mechanism carried by said secondary plate and providing means for supporting a work-piece during welding; and*



*wherein said mechanism comprises a saddle carried above said secondary plate, said saddle having an upper portion telescopically received by a lower portion, said upper portion being supported by lifting means for vertically adjusting the position of said saddle.*

---

**Re. 29,954**

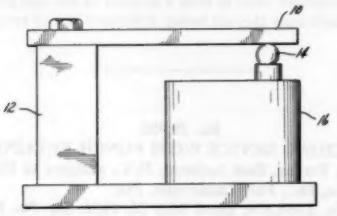
## ABRASION-RESISTANT MINERAL-FILLED THERMOSETTING MOLDING COMPOSITION

**Robert E. Wilkinson, Lafayette, Ind., assignor to Rostone Corporation, Lafayette, Ind.**

**Original No. 3,397,169, dated Aug. 13, 1968, Ser. No. 360,038, Apr. 15, 1964. Application for reissue Sep. 13, 1976, Ser. No. 722,801**

**Int. Cl.[2] C08K *3/36, 3/40*; C08L *63/08, 67/06***

**U.S. Cl. 260—37 EP** **11 Claims**




1. A molding composition adapted to undergo thermosetting reaction under molding conditions to produce a thermoset molding having improved abrasion-resistance and low strength loss, comprising a basic composition of from 15 percent to 60 percent of a thermosetting resin consisting of a free radical initiated *polyester or modified epoxy* polymer and a free-radical initiator therefor, and from 40 percent to 85 percent of mineral filler, and a component to improve the abrasion resistance of the basic composition, said component consisting of [a polyolefin] *polyethylene or polypropylene resin which is solid at normal temperature, in a proportion of from about one-half of one percent up to about* 3 percent of the total basic composition, said composition, when cured under heat and pressure, producing a molding which has little or no strength loss in comparison with moldings similarly prepared from the same composition without the abrasion-resistance improving component.

Re. 29,955

## METHOD OF DETECTING ANTIGENS OR ANTIBODIES

Irene Bornstein, Skokie, and Andreas A. Kapsalis, Northfield, both of Ill., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Original No. 3,949,064, dated Apr. 6, 1976, Ser. No. 410,066, Oct. 26, 1973. Application for reissue Mar. 13, 1978, Ser. No. 885,829

Int. Cl.[2] G01T *33/16;* A61K *43/00*

U.S. Cl. 424—1 11 Claims

1. A method for detecting the presence of proteins in samples, wherein said proteins are capable of acting as antigens or antibodies, said method comprising:

a. Coating at least a portion of the surface of a pair of water-insoluble receptacles with a known antigen;

b. Adding sample to said pair of receptacles;

*c. Allowing said pair of receptacles to remain undisturbed for a predetermined period of time;*

[c.] *d.* Adding labeled antibody to one of the receptacles of said pair;

[d. Allowing said pair of receptacles to remain undisturbed for a predetermined period of time;]

e. Removing the contents of the other receptacle of said pair and then adding to said other receptacle an amount of labelled antibody equal to that added to said one receptacle in step [(c)] *(d);*

f. Allowing said pair of receptacles to remain undisturbed for a predetermined period of time;

g. Removing the unbonded contents of each receptacle of said pair; and

h. Measuring the amount of said labelled antibody in each receptacle, whereby the presence of said proteins can be detected.

Re. 29,956

## LUMINESCENT SCREEN HAVING A MOSAIC STRUCTURE

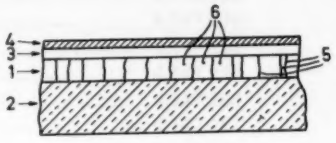
Martinus A. C. Lightenberg; Albert L. N. Stevels, and Agnes D. M. De Pauw, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Original No. 3,825,763, dated Jul. 23, 1974, Ser. No. 270,494, Jul. 10, 1972. Application for reissue Dec. 7, 1977, Ser. No. 858,100

Claims priority, application Netherlands, Jul. 10, 1971, 7109571

Int. Cl.[2] G01T *1/20*

U.S. Cl. 250—486 22 Claims




1. A method for forming a luminescent screen, comprising the steps of:

adhering a luminescent layer to a substratum having a coefficient of thermal expansion different from said luminescent layer; and

changing the temperature of both said substratum and said adhering luminescent layer from the temperature at which said adhering occurred in a direction which due to the different coefficients of thermal expansion creates laterally directed tensile forces in said luminescent layer sufficient to crack said layer into a closely spaced mosaic pattern of discrete luminescent areas.

# PATENTS

## GRANTED APR. 3, 1979

### ERRATA

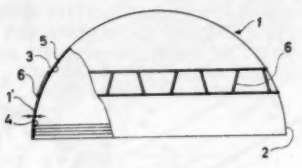
| For CLASS | See PATENT NO. |
|---|---|
| 060–290 | 4,146,986 |
| 405–205 | 4,147,036 |
| 414–680 | 4,147,258 |
| 414–745 | 4,147,259 |
| 414–098 | 4,147,260 |
| 414–557 | 4,147,261 |
| 414–687 | 4,147,262 |
| 414–718 | 4,147,263 |
| 414–411 | 4,147,264 |
| 414–416 | 4,147,265 |
| 414–480 | 4,147,266 |
| 414–498 | 4,147,267 |
| 180–064 R | 4,147,318 |
| 366–046 | 4,147,331 |
| 308–003.6 | 4,147,393 |
| 312–140.2 | 4,147,395 |
| 356–352 | 4,147,424 |
| 422–099 | 4,147,516 |
| 422–242 | 4,147,517 |
| 209–008 | 4,147,614 |
| 209–012 | 4,147,616 |
| 156–096 | 4,147,642 |
| 250–444 | 4,147,662 |
| 424–246 | 4,147,693 |
| 546–169 | 4,147,694 |
| 546–198 | 4,147,696 |
| 562–532 | 4,147,721 |
| 340–779 | 4,147,959 |
| 340–769 | 4,147,960 |
| 325–024 | 4,147,980 |
| 333–181 | 4,148,003 |

# PATENTS

## GRANTED APRIL 3, 1979

## GENERAL AND MECHANICAL

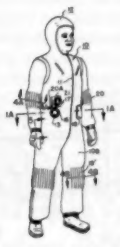
**4,146,932**
**BATHING CAP**
**Berthold Kalbas, Hollgehau 52, 8908 Krumbach, Fed. Rep. of Germany**
**Filed Apr. 11, 1977, Ser. No. 786,367**
**Claims priority, application Fed. Rep. of Germany, Apr. 15, 1976, 2616882**
**Int. Cl.[2] A42B *1/12***
**U.S. Cl. 2—68** **6 Claims**

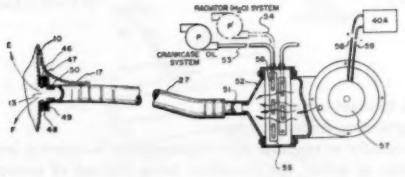


1. A bathing cap, comprising an elastic body part composed substantially of a polyurethane foam material which includes a polyalcohol component consisting of polyester polyol, said body part having two spaced face surfaces defining a wall of said cap therebetween and two surface layers each adjacent a respective one of said face surfaces, said wall of said body part having a thickness which is substantially less than 1 mm, and said surface layers of said wall having closed cells.

---

**4,146,933**
**CONDITIONED-AIR SUIT AND SYSTEM**
**Barry R. Jenkins, Box 160, Circleville, Utah 84723; Waldo C. Roberts, Salt Lake City, Utah, and Frank W. Roberts, Midvale, Utah, assignors to Barry R. Jenkins, Circleville, Utah**
**Filed Jul. 19, 1976, Ser. No. 706,764**
**Int. Cl.[2] A41D *13/00***
**U.S. Cl. 2—2** **4 Claims**

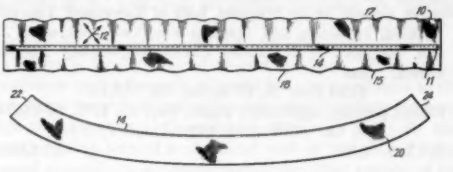




1. An item of wearing apparel for receiving interiorly, from an external source, conditioned air, said item comprising a torso covering having front-left and front-right, flat, essentially non-protruding conduit connection means, a rear, flat, essentially non-protruding conduit connection means, and semi-releasable flat means releasably secured over and about respective ones of said conduit connection means, each of said conduit connection means comprising a solid flat ring provided with a face-layer of the VELCRO type.

---

**4,146,934**
**CURVED FINISHING BAND FOR GARMENTS**
**Leslie Cohen, 7 E. 14th St., New York, N.Y. 10003**
**Filed Sep. 29, 1977, Ser. No. 837,677**
**Int. Cl.[2] A41B *1/12*; A41F *9/00***
**U.S. Cl. 2—127** **8 Claims**

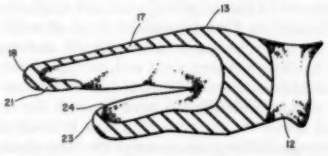


1. An elongated fabric band having integral outer sides which are mutually opposed and doubled over each other centrally along the length of the band, the length of the band being substantially annular when the ends thereof are connected, said band outer sides being of a piece of fabric which is doubled over at its center to form a double thickness and a folded elongated edge, a flat tape shorter in length than said piece of fabric adhered substantially at the center of said piece of fabric from end to end of said piece of fabric, thereby forming a continuous series of puckers in said piece of fabric said piece of fabric being cut on the bias, and said tape being non-bias cut, said band being curved or arcuate along its length, said piece of fabric, were the band to be straightened, including said continuous series of puckers while said tape remains flat, whereby said band, when curved from its straightened state has said puckers removed while said tape still remains flat.

6. A process for producing a curved or arcuate fabric band which comprises, sewing a flat, straight, non-bias cut, non-stretchable elongated tape along the full length of an elongated piece of fabric, which fabric is bias-cut and of a full straight length which is greater than the length of said tape so that puckers form in said piece of fabric, folding said piece of fabric longitudinally centrally upon itself and thereby enveloping said tape, and thereafter curving said band in the direction of the fold to eliminate said puckers.

---

**4,146,935**
**GLOVE FOR HOBBLING GRIP**
**Eddie Boyd Hinton, 1441 Glen Aulen St., Modesto, Calif. 95350**
**Filed Sep. 28, 1977, Ser. No. 837,604**
**Int. Cl.[2] A41D *19/00***
**U.S. Cl. 2—161 A** **7 Claims**



1. In an improved sports glove having a hand receptacle and finger receptacles, the base of said finger receptacles being connected to said hand receptacle wherein said finger receptacles have a palm side, a fingertip portion and, opposite to said palm side, a back side and wherein the hand receptacle has a

palm side and, opposite thereto, a back side, the improvement comprising an elastic material extending a predetermined distance along the back side of said hand receptacle to the base of a predetermined number of said finger receptacles and thence said elastic material extending along the full length of the back side of said predetermined number of finger receptacles and thence over the fingertip thereof curving down and around to the palmside of the finger receptacle and thence extending a predetermined distance down the palmside of the finger receptacle, said elastic material having physical dimensions and properties such as to allow a full range of flection and extension of the fingers contained within said predetermined number of finger receptacles.

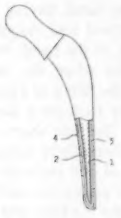
---

**4,146,936**

## IMPLANTS FOR BONES, JOINTS AND TOOTH ROOTS

**Masaya Aoyagi; Mikio Hayashi, both of Kawanishi; Yasuyuki Yoshida, Toyonaka, and Yoshiaki Yao, Takatsuki, all of Japan, assignors to Sumitomo Chemical Company Limited, Osaka, Japan**

**Filed Dec. 29, 1976, Ser. No. 755,137**
**Claims priority, application Japan, Dec. 30, 1975, 50-158745**
**Int. Cl.[2] A61F *1/24;* A61C *13/00, 13/30***
**U.S. Cl. 3—1.91** **21 Claims**



1. An implant for members of living bodies comprising a metallic base material, a layer of a material selected from the group consisting of hydroxyapatite and a mixture of hydroxyapatite and ceramics and a layer of a bonding agent formed between the metallic base material and the layer of hydroxyapatite or a mixture of hydroxyapatite and ceramics, said bonding agent being selected from the group consisting of molybdenum, tantalum, niobium, nickel-chromium-aluminum powdery mixture and nickel-aluminum powdery mixture.

---

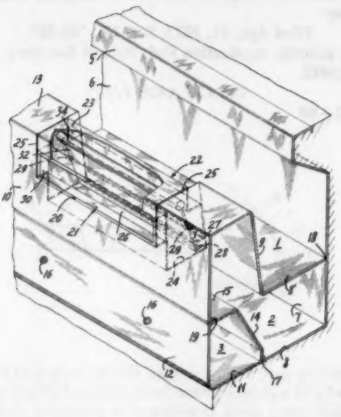
**4,146,937**

## PERIMETER SKIMMING GUTTER WITH FLUID LEVEL-RESPONSIVE WEIR CLOSURE FOR WEIR SKIMMING FLOW CONTROL

**William H. Baker, 30 Honeysuckle Woods, Clover, S.C. 29710**

**Continuation-in-part of Ser. No. 579,997, May 22, 1975. This application Jul. 25, 1977, Ser. No. 818,625**
**Int. Cl.[2] E04H *3/16, 3/20;* E02B *7/20***
**U.S. Cl. 4—172.17** **19 Claims**

1. A skimming weir assembly for use in a perimeter retaining wall of a swimming pool having at least one gutter conduit about the perimeter of the swimming pool and adapted to carry water at a level below a predetermined level of water in the swimming pool, comprising a weir housing; an enclosed weir flow passage having enclosing walls and providing a confined fluid flow connection between the pool and at least one gutter conduit said passage entering the pool through the retaining wall at a level below the top thereof; a flow restriction in the weir flow passage defining maximum weir flow through the weir flow passage; a fluid level responsive buoyant weir closure movable according to water level in the weir flow passage between a position at a high water level in which it engages at least one wall and closes the passage to flow, and a position at a lower water level in which it is away from such engagement and opens the passage to flow, and disposed in the weir flow passage between the pool and the flow restriction; and means to retain the weir closure in the flow-open position at the lower water level corresponding to normal weir flow; the flow restriction blocking flow in excess of the normal weir flow and thereby backing up water and increasing water level in the



weir flow passage from the flow restriction back to the weir closure; and the weir closure buoyantly responding to such increasing water level to rise into engagement with at least one wall and close off the weir flow passage at a predetermined water level above the level corresponding to normal weir flow.

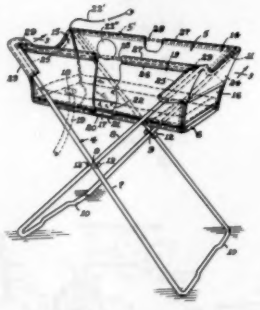
---

**4,146,938**

## COMBINATION BATHTUB AND BASSINET STRUCTURE

**Pauline V. Shakas, 1620 Lasuen Rd., Santa Barbara, Calif. 93103**

**Filed Feb. 4, 1977, Ser. No. 765,815**
**Int. Cl.[2] A47K *3/064***
**U.S. Cl. 4—177 R** **7 Claims**



1. A bassinet including
a supporting frame structure,
a generally rectangular open top container somewhat larger than an infant, the container being formed of interconnected, flexible side walls, end walls, and a bottom wall,
means for attaching the container to the frame,
a waterbed mattress consisting of a bladder that may be partially or completely filled with water, the amount of water included in the bladder determining its firmness, the bladder including a sealable opening permitting the

amount of liquid contained in the mattress to be varied, the mattress being snugly received in the bottom of the container,

the container further including a removable, rigid panel underlying substantially all of the waterbed mattress, whereby the firmness of the mattress support provided by the bassinet can be adjusted from a very soft condition approximating a prenatal environment and suitable for cradling a baby's spine in a fetal position to a firm condition suitable for properly supporting the spine of an infant resting flat on its back, permitting an infant to assume the position most natural to it at that stage of its development.

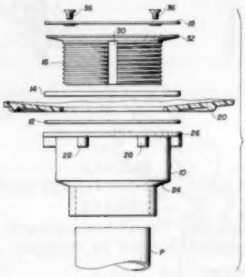
---

**4,146,939**

## DRAIN FITTING FOR PRE-FORMED OR PRE-ASSEMBLED SHOWERS, ETC.

**Lewis B. Izzi, 918 Surrey Dr., Shelby, N.C. 28150**

**Filed Dec. 2, 1977, Ser. No. 856,901**
**Int. Cl.[2] A47K *1/14*; E03C *1/26***
**U.S. Cl. 4—286** **4 Claims**



1. A drain fitting for connecting the drainage opening or receptor of shower stalls, etc. with a drain pipe comprising, in combination, a base connector having a lower shouldered portion to be mounted on the upper end of a drain pipe closely adjacent the receptor and a flanged, upper portion; a drainage barrel having a peripheral flange insertable into said upper portion; a drainage plate mounted on said barrel; means connecting said base connector and said barrel so as to force the flanges thereof into sealing engagement with the edges of the receptor; said connecting means comprising relatively rotatable mating threaded portions; and vertical slots formed in one of said threaded portions to provide secondary drainage means to the drain pipe.

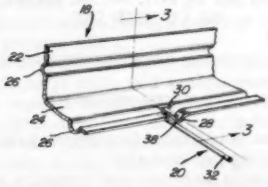
---

**4,146,940**

## BED RAILS WITH CROSS WIRE

**Harry Fredman, and Irving Fredman, both of 908 SW. Washington, Peoria, Ill. 61602**

**Filed Aug. 23, 1977, Ser. No. 827,444**
**Int. Cl.[2] A47C *17/86***
**U.S. Cl. 5—9 B** **3 Claims**



1. A bunk bed assembly comprising a top bed and a bottom bed wherein at least said top bed comprises a pair of side rails supporting a spring assembly therebetween with each of the side rails including a horizontal flange having an inner edge extending longitudinally of said flange and disposed in facing relation to the inner edge of the other of said flanges and extending under and directly supporting the spring assembly, a tension member interconnecting the horizontal flanges to prevent outward deflection of the side rails, the improvement comprising each horizontal flange including a downwardly offset portion in the central area thereof and a laterally opening aperture at the end of the offset portion, said tension member being in the form of a wire having a reversely bent end portion defining a hook-shaped end engageable through the aperture and with the downwardly offset portion by engaging the hook-shaped end with the horizontal flange from a position below the horizontal flange, wherein said laterally opening aperture is dimensioned in relation to said hook-shaped end to preclude assembly of the wire with the horizontal flange by insertion from the upper surface of the horizontal flange, and wherein said horizontal flange is provided with a longitudinal reinforcing rib of generally channel shaped configuration extending lengthwise in the flange in adjacent but spaced relation to the inner edge thereof, said offset portion extending from the inner edge of the horizontal flange to the distal wall of the rib, said aperture being formed in the distal wall of the rib and being shaped generally as a continuation of the offset portion of the flange, the hook-shaped end of the wire extending through said aperture.

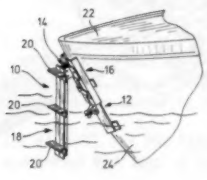
---

**4,146,941**

## BOAT BOW LADDER ASSEMBLY

**Ivan S. Haslam, Bountiful, Utah, assignor to Shirley B. Haslam, Bountiful, Utah**

**Filed Oct. 12, 1977, Ser. No. 841,276**
**Int. Cl.[2] B63B *17/00***
**U.S. Cl. 9—1.6** **8 Claims**



1. A boat bow ladder mechanism comprising:

support means comprising means to be fixedly secured to the outside of the bow of a boat below the deck line thereof and above the water line and disposed angularly with respect to the horizontal and vertical;

ladder means comprising means physically connected to the support means exterior of the bow below the deck line for transfer of load thereto and rung carrying means disposed, at least during use, in a substantially vertical orientation.

---

**4,146,942**

## PAPER PADDING OR TABLETING PRESS

**Dan P. Westra, and John Siewert, both of Grand Haven, Mich., assignors to The Challenge Machinery Company, Grand Haven, Mich.**

**Filed Dec. 21, 1977, Ser. No. 862,819**
**Int. Cl.[2] B42C *19/00***
**U.S. Cl. 11—1 B** **20 Claims**

1. In a paper padding press, the combination comprising:

a support base;

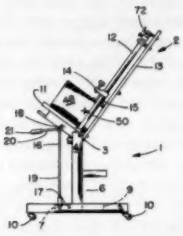
a tiltable rack including a stacking table and movable means for guiding, said means for guiding disposed at a right angle to said stacking table;

means for applying compression to a stack of pads;

a stop rod having first and second ends, said stop rod being

pivoted on said stacking table from a point on the underside of said stacking table; and

an aperture in said support base below said stacking table for receiving said first end of said stop rod, said stop rod and



said aperture cooperating to alternately latch said tiltable rack in a working position and gravity secure said tiltable rack in a stacking position without interference with said movable means for guiding.

---

**4,146,943**

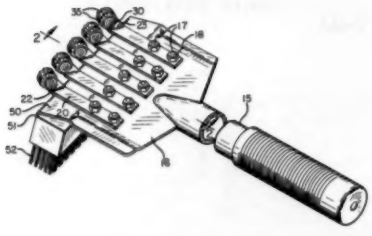
**GROOVED GRILL CLEANER**

**Donald J. Wertheimer, 8645 SE. 36th Ave., Portland Oreg. 97202, and Ralph A. Holmes, 11505 NE. Glisan St., Portland, Oreg. 97220**

**Filed Mar. 13, 1978, Ser. No. 885,478**

**Int. Cl.[2] A47J *49/00*; A47L *13/06, 13/34***

**U.S. Cl. 15—111** **8 Claims**



1. A grooved grill cleaner comprising an elongated handle, a plurality of spring fingers extending in side by side relation in a common plane from the distal end of said handle, and cutters mounted on free ends of said fingers for movement along the grooves in said grill to clean the grooves, the free ends of said fingers being movable relative to each other in said common plane to adjust themselves to the spacing or irregularities of said grooves and movable perpendicular to said common plane relative to each other to adjust themselves to the thickness of deposits in the grooves, said cutters being disposed transversely of said fingers for said movement along said grooves, said cutters comprising cutter discs rotatably mounted on said fingers, each of said cutter discs comprising a washer having teeth formed by perpheral radial cuts in the washer, said teeth being twisted out of the plane of the washer with the ends of the teeth presenting a substantially continuous circumference on the washer without circumferential gaps between the teeth.

---

**4,146,944**

**CARPET CLEANING MACHINE**

**Louis J. Pinto, Scotch Plains, N.J., assignor to General Signal Corporation, Rochester, N.Y.**

**Filed Aug. 19, 1977, Ser. No. 826,013**

**Int. Cl.[2] A47L *7/00***

**U.S. Cl. 15—321** **11 Claims**

1. A floor covering cleaning machine for scrubbing, rinsing, and vacuuming a floor covering and comprising in combination:

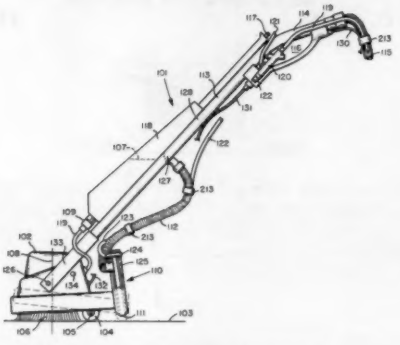
a. first and second liquid sources and a vacuum source;

b. a head coupled to said first and second liquid sources and said vacuum source and selectively and guidingly movable on a pair of rollers over the floor covering to be cleaned;

c. said head including a motor driven scrub brush forward of said pair of rollers for scrubbing the floor covering;

d. said head further including a channel vacuum inlet rearward of said pair of rollers and coupled to said vacuum source, for removing liquids and entrained dirt from the floor covering when positioned in appropriate proximity to the floor covering;

e. first means coupled between said first liquid source and said head for selectively delivering controlled amounts of said first liquid to the floor covering forward of said pair of rollers;



f. second means coupled between said second liquid source and said head for selectively delivering controlled amounts of said second liquid to the floor covering rearward of said pair of rollers;

g. said pair of rollers coupled to said head rearward of the center of gravity of said head whereby, in the absence of other controlling forces, said head tends to pivot about said rollers, in response to the force of gravity, to maintain said scrub brush in contact with the floor covering; and

h. an operating handle coupled to said head for guiding said head and for selectively applying a force to pivot said head about said rollers and lift said scrub brush from contact with the floor covering and to simultaneously lower said vacuum inlet whereby the scrubbing of the floor covering is interrupted and said vacuum inlet is positioned proximate to the floor covering for the removal of liquids and dirt from the floor covering.

---

**4,146,945**

**CARCASS SPLITTING MACHINE**

**Septime R. Hotard, 390 NW. Bay St., Ponchatoula, La. 70454**

**Filed Sep. 20, 1977, Ser. No. 834,985**

**Int. Cl.[2] A22B *5/20***

**U.S. Cl. 17—23** **9 Claims**

1. Apparatus for cutting carcasses, which comprises:

a frame;

means for supporting at least one carcass;

a band saw;

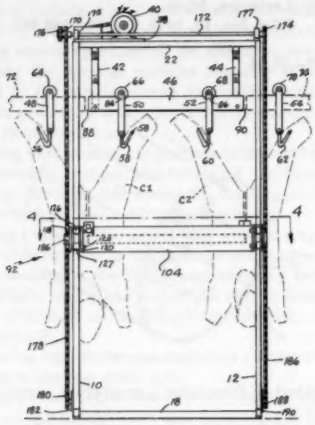
means coupled to said frame for supporting said band saw;

means for driving said band saw;

means for moving said band saw supporting means along said frame so as to split said carcass;

wherein said frame includes vertical support members to which said band saw supporting means are movably coupled, said band saw being oriented substantially horizontally by its supporting means; and

wherein said carcass supporting means comprises a guide rail supported by said frame and having a pair of spaced



openings therein for permitting passage of said band saw therethrough.

---

**4,146,946**

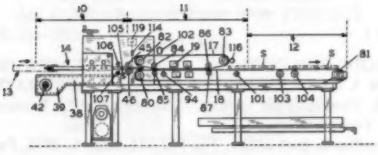
## APPARATUS FOR STEAMING OF TUBULAR KNITTED FABRIC

**Lawrence Plaia, Brooklyn, and Steven Grzybowski, Plainview, both of N.Y., assignors to Samcoe Holding Corporation, Woodside, N.Y.**

**Filed Jul. 22, 1977, Ser. No. 817,911**

**Int. Cl.[2] D06C** *5/00, 27/00*

**U.S. Cl. 26—18.5** **17 Claims**



1. Apparatus for the processing of tubular knitted fabrics, particularly in disconnected segments having integrally joined cuff and body portions, which comprises

(a) spreader means for engaging a segment internally and distending it laterally to flat, two-layer form of predetermined width,

(b) said spreader means comprising spaced frame members supporting fabric advancing belts,

(c) a pair of gripping rollers arranged in straddling relation to said spreader means and arranged to have effective full width gripping relation with a fabric segment on said spreader means,

(d) said spreader means having a discharge end downstream of said gripping rollers,

(e) a pair of conveyor blankets positioned generally adjacent to the discharge end of said spreader means for receiving a fabric segment therefrom and operative to engage and grip the fabric on opposite sides, over its full width and for at least a substantial lengthwise extent,

(f) controllable driving means for said gripping rollers and conveyor blankets, whereby said blankets may be driven at a speed greater than the gripping rollers to effect elongation of fabric on said spreader frame, and

(g) means for steaming the fabric while gripped by said conveyor blankets.

10. Apparatus for processing tubular knitted fabrics, particularly disconnected segments thereof having integrally connected cuff and body portions, which comprises,

(a) a spreader frame having driven belts for engaging the fabric internally and advancing it while spreading it to predetermined width,

(b) a pair of conveyor blankets arranged in generally opposed relation for gripping and conveying fabric segments,

(c) said spreader frame having a discharge end at the entry end of said conveyor blankets,

(d) first controllable nip forming means for guiding said blankets into initial fabric gripping engagement a controllable distance downstream of said discharge end,

(e) said first nip forming means comprising a pair of nip forming elements movable toward and away from each other between relatively more closed and relatively more open positions,

(f) segment edge detecting means operative to sense the approach toward said first nip forming means of the end edges of a fabric segment,

(g) control means responsive to said detecting means for maintaining said nip-forming means relatively more open for one edge (cuff) than the other,

(h) second nip forming means located substantially downstream of said first nip-forming means, and

(i) means for steaming the fabric in the region between said first and second nip forming means.

---

**4,146,947**

## SPREADER ROLL

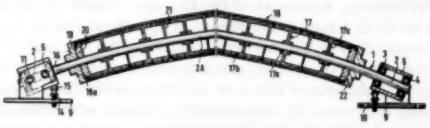
**Friedrich Richter, Bielefeld, Fed. Rep. of Germany, assignor to Hermann Windel GmbH & Co., Bielefeld, Fed. Rep. of Germany**

**Filed Jul. 14, 1977, Ser. No. 815,501**

**Claims priority, application Fed. Rep. of Germany, Jul. 14, 1976, 7622138**

**Int. Cl.[2] D06C** *3/06*

**U.S. Cl. 26—104** **6 Claims**



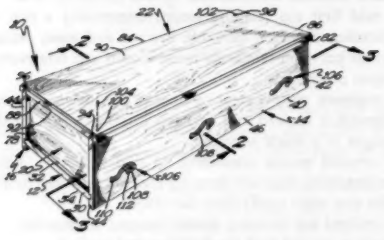
1. In a spreader roll, the combination of an elongated arcuate flexible shaft having two end portions and an intermediate portion; support means rotatably mounting the end portions of said shaft, said support means including two sleeves, one for each end portion of said shaft and each rotatably receiving the respective end portion, and stationary holder means for each sleeve, said sleeves having pairs of coaxial pivot members disposed diametrically opposite each other and said holder means having elongated slots for the pivot members of the respective sleeves; a plurality of annular supporting elements surrounding and rotatable with the intermediate portion of said shaft; and means for adjusting the orientation of said shaft with respect to said support means, including pairs of mutually inclined adjusting members mounted in each holder means and operable to move the respective sleeves with respect to the associated holder means.

**4,146,948**

## CASKET

**Elliott F. Royce, 2517 Huntingdon Ave., Minneapolis, Minn. 55416; Jeff L. Royce; Alan S. Briskin, both of Minneapolis, and James W. Ogland, Wayzata, all of Minn., assignors to Elliott F. Royce, Minneapolis, Minn.**

**Filed Oct. 18, 1977, Ser. No. 843,337**
**Int. Cl.[2] A61G *17/00***
**U.S. Cl. 27—2** **25 Claims**



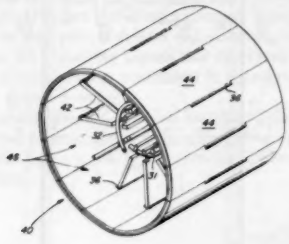
1. Casket comprising, in combination: a bottom including a first side edge, a second side edge, a first end edge, a second end edge, a top surface, and a bottom surface; a first side including a top edge, a bottom edge, a first end edge, a second end edge, an outside surface, and an inside surface; a second side including a top edge, a bottom edge, a first end edge, a second end edge, an outside surface, and an inside surface; a first end including a top edge, a bottom edge, a first side edge, a second side edge, an outside surface, and an inside surface; a second end including a top edge, a bottom edge, a first side edge, a second side edge, an outside surface, and an inside surface; a top including a first side edge, a second side edge, a first end edge, a second end edge, an outside surface, and an inside surface; first means for longitudinally, slidably interlocking the first side to the bottom and for preventing movement of the first side relative to the bottom in all directions other than its longitudinal; second means for longitudinally, slidably interconnecting the second side to the bottom and for preventing movement of the second side relative to the bottom in all directions other than its longitudinal; third means for longitudinally, slidably interconnecting the first end to the first side and for preventing movement of the first end relative to the first side in all directions other than its longitudinal; fourth means for longitudinally, slidably interconnecting the first end to the second side and for preventing movement of the first end relative to the second side in all directions other than its longitudinal; fifth means for longitudinally, slidably interconnecting the second end to the first side and for preventing movement of the second end relative to the first side in all directions other than its longitudinal; sixth means for longitudinally, slidably interlocking the second end to the second side and for preventing movement of the second end relative to the second side in all directions other than its longitudinal; seventh means for longitudinally, slidably interconnecting the top of the first side and for preventing movement of the top relative to the first side in all directions other than its longitudinal; eighth means for longitudinally, slidably interconnecting the top to the second side and for preventing movement of the top relative to the second side in all directions other than its longitudinal, with the bottom, sides, ends, and top interfitting in a fashion that the assembly of the last part locks all preceding parts and prevents movement of the preceding parts in any of their longitudinal directions to form a rigid, unitary, complete casket obviating the necessity of any further fastening elements of any kind.

**4,146,949**

## METHOD FOR MAKING A MAGNETRON ANODE

**Ralph F. Derby, Jr., Wilmington, Mass., assignor to Raytheon Company, Lexington, Mass.**

**Filed Jan. 12, 1978, Ser. No. 868,961**
**Int. Cl.[2] H01P *11/00***
**U.S. Cl. 29—25.14** **4 Claims**



1. A method of fabricating a magnetron anode comprising the steps of:

forming a T-shaped blanks each having first and second supporting structures thereon, said blanks each having a leg portion and an arm portion, said first and second supporting structures being positioned on opposite sides of said leg portion;

bending the leg portions of a first group of said blanks to provide a set of vanes having said first support structure on a top side thereof;

bending the leg portions of the blanks of a second group of said blanks to provide a set of vanes having said second support structure on a top side thereof;

arranging said vanes to point radially inwardly with the arm portions of said blanks forming an outer cylindrical surface of an assembly of said blanks; and

securing said assembly to the interior of a sleeve.

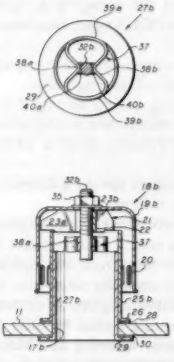
---

**4,146,950**

## METHODS FOR FORMING BUBBLE CAP ASSEMBLIES FOR A GAS AND LIQUID CONTACT APPARATUS

**John R. Powers, Port Arthur, Tex., assignor to Texaco Inc., New York, N.Y.**

**Continuation-in-part of Ser. No. 712,451, Aug. 6, 1976, Pat. No. 4,059,877. This application Oct. 25, 1977, Ser. No. 845,200**
**Int. Cl.[2] B23P *15/00*; B01D *47/12***
**U.S. Cl. 29—157 R** **8 Claims**



2. A method for forming a bubble cap assembly for sealing a hole in a tray deck comprising,

(a) forming an inner tubular sleeve having an outside diameter substantially equal to the hole diameter,

(b) cutting straight into two opposite cylindrical sides of the upper portion of the inner tubular sleeve normal to the longitudinal axis of the tubular sleeve to a distance inwardly to include at least substantially 100° of the circumference of each of the two opposite cylindrical sides for forming two cut portions on the tubular sleeve,

(c) bending the two cut portions inwardly in a direction normal to the tubular sleeve longitudinal axis into two bent cut portions for forming a kidney shape contiguous with a hold-down stud,

(d) securing the two bent cut portions to the hold-down stud for providing a rigid attachment of the inner tubular sleeve to the hold-down stud for forming an improved tubular body for the bubble cap assembly,

(e) forming a tubular riser contiguous with the major portion of the outer surface of the inner tubular sleeve for minimizing leakage in the bubble cap assembly between the inner tubular sleeve and the tubular riser and for assuring proper alignment of the bubble cap assembly relative to the tray deck,

(f) positioning the tubular riser and inner tubular sleeve over the hole in the tray deck, and

(g) placing a spider and bubble cap over the hold-down stud on top of the tubular riser and fastening the spider and bubble cap on top of the hold-down stud for centering the bubble cap and spider over the hole, for assuring proper alignment of the bubble cap assembly relative to the tray deck for minimizing leakage, and for reducing the number of assembly pieces for reducing the number of fabrication steps for lowering fabrication costs of the complete bubble cap assembly.

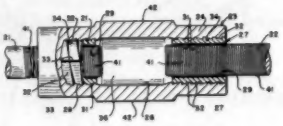
---

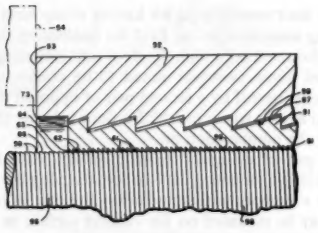
**4,146,951**

## METHOD AND APPARATUS FOR TENSIONING CONCRETE REINFORCING TENDONS

**George H. Howlett, Oakland, Calif., assignor to Howlett Machine Works, Berkeley, Calif.**

**Filed Jun. 22, 1976, Ser. No. 698,771**
**Int. Cl.[2] B21D *39/00*; E04C *5/08*; F16B *2/12***
**U.S. Cl. 29—452** **7 Claims**





1. In a method for tensioning a reinforcing tendon or the like including the steps of:

i. mounting a convergently movable wedge assembly on said tendon, said wedge assembly including a central tendon receiving bore formed with a plurality of tendon gripping thread-like teeth extending in a spiral array, said teeth having a surface hardness substantially in excess of the surface hardness of said tendon, and said wedge assembly including an exterior surface in the form of adjacent convergently tapered camming areas in a spiral array of like hand to said spiral array of said teeth; and

ii. mounting wedge assembly receiving housing means on said wedge assembly, said housing means being formed with a bore therein having camming areas dimensioned for mating engagement with said exterior surface of said wedge assembly to induce convergent movement of said wedge assembly, and said housing means being formed with support means for support of axial forces induced in said housing means;

the improvement in said method comprising the steps of:

a. prior to mounting said wedge assembly on said tendon, forming an extremely shallow spiral groove in the exterior surface of said tendon, said groove being formed for receipt therein of the ends of said teeth of said wedge assembly;

b. mounting said wedge assembly on said tendon with said ends of said teeth mounted in mating engagement with said groove;

c. supporting said housing by said support means for axial loading thereof; and

d. rotating said housing means while supported to advance said wedge assembly axially in said housing means in a direction inducing tension forces in said tendon while simultaneously and proportionally inducing radial gripping forces in said wedge assembly until a substantial axial tension force is induced in said tendon by said rotation.

6. In an anchorage for securement of a concrete reinforcing tendon under tension including anchor housing means, a convergently acting wedge assembly mounted in said housing means and having a bore therein dimensioned to receive a tendon, said bore being formed with tendon gripping teeth, and a concrete reinforcing tendon positioned in said bore and engaged by said teeth, the improvement comprising:

said tendon having at least one groove therein dimensioned for receipt of the ends of said teeth and extending over a length of said tendon in excess of the distance of axial displacement of said tendon during tensioning, and said groove being formed to a depth of not greater than about 0.40 millimeters from the nominal outside diameter of said tendon.

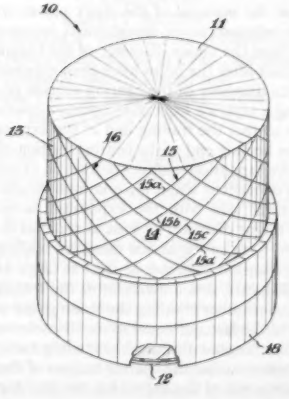
---

**4,146,952**

## METHOD FOR THE INSULATION OF A TANK

**Robert B. Bennett, Hebron, Ohio, assignor to The Dow Chemical Company, Midland, Mich.**

**Filed Jul. 5, 1977, Ser. No. 813,148**
**Int. Cl.[2] B23P *11/02***
**U.S. Cl. 29—452** **4 Claims**



1. A method for affixing a plurality of insulating panels to an

external cylindrical surface of a generally cylindrical tank, the tank having a top and a bottom and a generally cylindrical side wall, the steps of the method comprising disposing at least a first plurality of tensioned elongate tension members about the cylindrical wall of the tank and external to the tank, the tension members extending from a location adjacent the top of the tank to the bottom of the tank, the tension members being in generally spaced-part relationship to each other and for at least a major portion of their length being generally helically disposed on the surface of the tank, applying insulating panels to the helically disposed tension members and the external surface of the tank by positioning panels in a desired location and affixing the panels to the generally helically disposed tension members.

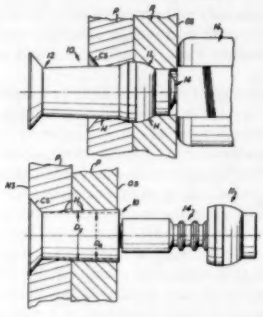
---

**4,146,953**

## METHOD OF INSTALLING A REVERSE TAPER FASTENER IN WORKPIECES

**John O. King, Jr., 3990 N. Ivy Rd., Atlanta, Ga. 30342**

**Division of Ser. No. 554,762, Mar. 3, 1975, Pat. No. 4,012,885.**
**This application Mar. 21, 1977, Ser. No. 779,802**
**Int. Cl.[2] B23P *11/02***
**U.S. Cl. 29—453** **3 Claims**



1. A method of installing a fastener through work pieces to form a joint, the fastener having an enlarged head integral with the trailing end of a bearing section with a bearing surface thereon tapering from a bearing major prescribed diameter at the leading end of the bearing section to a bearing minor prescribed diameter trailing said bearing major diameter where the bearing minor diameter is less than the bearing major diameter, comprising the steps of:

(a) forming generally aligned holes through the work pieces of a prescribed substantially constant initial diameter smaller than the major diameter of the bearing section such that the material of the work pieces will cause the holes to rebound to an unrestrained recovered diameter smaller than the major diameter of the bearing section of the fastener after the holes have been expanded at least to the major diameter of the bearing section of the fastener;

(b) locating a separate expansion member coaxially with the fastener so that the trailing end of the expansion member abuts the leading end of the bearing section of the fastener where the expansion member defines an expansion surface thereon concentric about the common fastener and expansion central axis with the expansion surface having a leading minor diameter at least as small as the initial hole diameter, a major expansion diameter trailing the leading minor expansion diameter at least as large as the bearing major diameter, and a diameter at the trailing end of the expansion member abutting the leading end of the bearing section of the fastener equal to the diameter of the leading end of the fastener abutting the trailing end of the expansion member so that the bearing section of the fastener and the trailing end of the expansion member form a substantially continuous surface across the abutting ends;

(c) while maintaining the fastener and expansion member coaxially located, forcing the fastener into the holes with the fastener forcing the expansion member through the holes immediately preceding the leading end of the bearing section of the fastener to keep the leading end of the fastener in abuttment with the trailing end of the expansion member so as to selectively expand the thusly formed holes to the major expansion diameter of the expansion surface such that the holes will contract to an unrestrained recovered diameter smaller than the bearing major diameter of the bearing section of the fastener after expansion and insert the bearing section of the fastener through the holes while expanded until the head of the fastener bears against the work pieces with the material of the work pieces about the holes moving smoothly over the abutting ends of the bearing section of the fastener and the expansion member without damaging the work pieces about the holes so that the work pieces contract into bearing contact with at least the major portion of the bearing surface on the bearing section of the fastener within the holes to grip the bearing section of the fastener, hold the fastener in place in the work pieces; and

(d) after the fastener is in the holes with the bearing section being gripped by the work pieces, removing the expansion member from the leading end of the bearing section of the fastener.

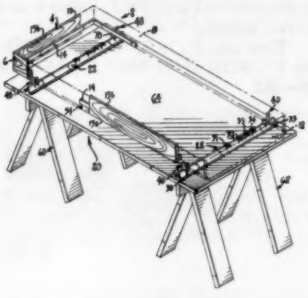
---

**4,146,954**

## ASSEMBLY JIG FOR PREFABRICATED DOOR UNIT

**Dallas C. Day, Mendota Heights, Minn., assignor to Interior Wood Products, Inc., Saint Paul, Minn.**

**Filed Mar. 22, 1978, Ser. No. 888,952**
**Int. Cl.[2] B25H *1/04, 1/10, 7/02***
**U.S. Cl. 29—467** **14 Claims**



1. A door assembly jig kit having component parts capable of being assembled in the field for facilitating the assembly of a prefabricated door unit, the door unit including a first pair of opposed frame members suited to be connected together at both ends thereof by a second pair of opposed frame members to form a door frame in which a door is hung, the jig kit comprising the combination of:

a. a pair of elongated beam members, each beam member having a mounting surface for attaching the beam member to a support surface, whereby the pair of beam members may be mounted on the support surface in a parallel and spaced apart orientation; and

b. two pairs of door frame holding members, each of the holding members having attachment means suited to detachably affix each pair of holding members in a spaced apart orientation on one of the beam members with the holding members on the first beam member being generally aligned with the holding members on the second beam members, each of the holding members having holding means suited to releasably receive and support one pair of opposed frame members to allow the other pair

of opposed frame members to be affixed thereto to form the door frame.

---

**4,146,955**

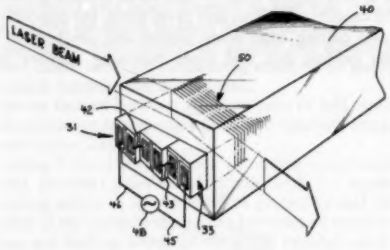
## METHOD OF FABRICATING A STEPPED-ARRAY ACOUSTO-OPTIC BEAM DEFLECTOR

**Eddie H. C. Young, Jr., Indialantic, Fla., and Shi-Kay Yao, Brea, Calif., assignors to Harris Corporation, Melbourne, Fla.**

**Filed Aug. 15, 1977, Ser. No. 824,739**

**Int. Cl.[2] H04R *31/00***

**U.S. Cl. 29—594** **9 Claims**




1. A method of fabricating a stepped-array acousto-optic beam deflector comprising the steps of:

(a) providing a substrate having upper and lower surfaces lying in mutually oblique planes;

(b) forming an electro-acoustic transducer on the upper substrate surface;

(c) cutting through the substrate and the upper and lower substrate surfaces to form a plurality of disjoined transducer elements positioned side by side; and

(d) mounting the disjoined transducer elements in tandem to an acousto-optic element with the upper substrate surfaces disposed distal the acousto-optic element.

---

**4,146,956**

## METHOD FOR MANUFACTURING A MULTIPOLAR ERASING HEAD

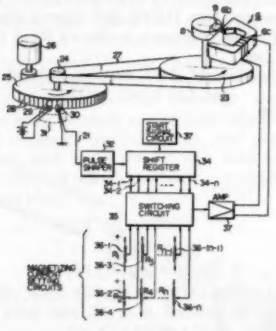
**Tatsuo Fujiwara, Yokohama, Japan, assignor to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan**

**Filed Sep. 7, 1977, Ser. No. 831,253**

**Claims priority, application Japan, Apr. 9, 1976, 51-39394; Nov. 16, 1976, 51-136888; Nov. 16, 1976, 51-136889; Jan. 12, 1977, 52-1453**

**Int. Cl.[2] G11B *5/42***

**U.S. Cl. 29—603** **9 Claims**




9. A manufacturing method of a multipolar erasing head comprising the steps of:

moving a multipolar erasing head member of which the surface to be magnetized is disposed in one of a state slidably in contact with, and a state very slightly spaced apart from an electromagnet having a gap, the front of which is passed by said erasing head member surface;

detecting the time that a specified position to be magnetized on the surface of said erasing head member passes the front of said gap during said relative movement and producing a control signal in synchronism with said time; and

supplying to an exciting winding wound around said electromagnet pulse current with polarities and amplitudes corresponding to said controlling signal, said pulse current being supplied from a magnetizing current supply circuit in response to said control signal applied thereto.

---

**4,146,957**

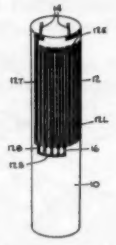
## THICK FILM RESISTANCE THERMOMETER

**Donald A. Toenshoff, Jackson Township, Ocean County, N.J., assignor to Engelhard Minerals & Chemicals Corporation, Iselin, N.J.**

**Filed Jan. 17, 1977, Ser. No. 760,044**

**Int. Cl.[2] B05D *5/12, 1/32;* H01C *7/02, 17/00***

**U.S. Cl. 29—612** **9 Claims**



1. A method of fabricating a stable thick film having a high temperature coefficient of resistance and a uniform change of resistance with temperature, which comprises

(a) preparing a paste comprising substantially non-agglomerated platinum powder having a purity of at least 99.9%, a substantially contaminant-free frit, and an organic vehicle;

(b) applying said paste as a continuous thick film strip onto a ceramic substrate; and

(c) firing said strip at a temperature of at least 1450° C. to produce a TCR of at least about 3850 ppm/° C. in the fired film.

---

**4,146,958**

## SAFETY RAZOR

**Evan N. Chen; Edward A. Beddall, both of Fairfield, and Bryan J. Goddard, North Branford, all of Conn., assignors to Warner-Lambert Company, Morris Plains, N.J.**

**Filed Oct. 15, 1976, Ser. No. 732,567**

**Int. Cl.[2] B26B *21/14, 21/22***

**U.S. Cl. 30—47** **14 Claims**

1. A razor blade cartridge comprising:

a seat member having an integral blade edge guard disposed transversely of and parallel to a forward margin of the seat member, the guard having a plurality of forwardly projecting teeth forming a comb guard;

a first razor blade disposed on a substantially planar surface of the seat member having a cutting edge parallel to the forward margin and located rearwardly of the guard;

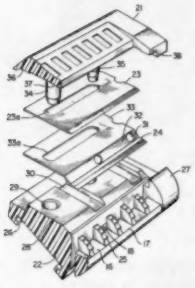
a second razor blade having a cutting edge located parallel to and rearwardly of the first blade edge;

a cap member having a bearing surface in contact with the second blade and affixed to the seat member for clamping the first and second blades in desired position;

means for maintaining the blade cutting edges a predetermined normal distance apart;

the comb guard comprising a plurality of arcuately shaped teeth projecting substantially normally to planes bisecting the cutting edges of the first and second razor blades, the teeth being joined by a transversely extending member parallel to the forward margin forming substantially planar webs between respective teeth, the webs located in a plane having a selected angle with respect to the bisecting planes of the blade cutting edges, the teeth projecting at least approximately 0.020 inch above the webs and having a pitch between approximately 0.050 and 0.125 inch and a width between approximately 0.020 and 0.062 inch, the maximum width of the teeth selected to be less than approximately one-half the pitch; and

wherein the first and second blade cutting edges have tangent angles between approximately 23 degrees and 27 degrees, the first blade cutting edge has a negative exposure between approximately 0.001 and 0.005 inch and a span between approximately 0.040 and 0.065 inch, and the second blade cutting edge has a negative exposure between approximately 0.004 and 0.008 inch and a span between approximately 0.040 and 0.065 inch.



13. A razor blade cartridge comprising:

a seat member;

a plurality of razor blades including a first blade disposed on a planar surface of the seat member having a cutting edge parallel to a forward margin of the seat member and a second blade in juxtaposition to the first blade having its cutting edge rearwardly located and parallel to the first blade cutting edge, the first blade being bent along a first transverse line parallel to its cutting edge at an angle of approximately 30 degrees to form a ramp portion at an angle away from the plane of the second blade and being inversely bent along a second transverse line parallel to and forwardly of the first line so that its cutting edge is parallel with the plane of the second blade, the ramp portion having a plurality of apertures therein;

a cap member having a bearing surface in contact with at least one of the blades and affixed to the seat member for clamping the blades in desired positions; and

a guard member extending transversely of and parallel to the forward margin of the seat member and forwardly of the blade cutting edges.

---

**4,146,959**

## DEVICE FOR CUTTING A CYLINDRICAL ARTICLE

**Thomas P. Hopper, R.F.D. 1, Box 689, Durham, Conn. 06422**

**Filed Jun. 2, 1977, Ser. No. 802,823**

**Int. Cl.[2] B23D *21/04***

**U.S. Cl. 30—95** **12 Claims**

1. A device for cutting a cylindrical article such as a window shade or the like, comprising:

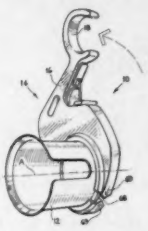
A. tubular support means for encircling the article in non-rotative relation thereto;

B. guide means, including

1. a guide housing mounted with said support means for continuous rotation relative thereto about the axis thereof and, therefore, about a cylindrical article encircled in non-rotative relation by said support means, said guide housing defining a blade guiding slot which constitutes a plane extending perpendicularly to the axis of said support means; and

2. a blade mounting member mounted for pivoted movement in said housing about a pivot point;

C. a planar blade, having a cutting edge of length sufficient to diametrically span said tubular support, mounted at one end of said cutting edge on said blade mounting member to be cantilevered from said pivot point, the opposite end of said cutting edge being guided and confined in said blade guiding slot, said blade mounting member being



arranged to thereby mount said blade for pivoted movement about said pivot point from a first position with said cutting edge tangentially intersecting the tubular section defined by said support means to a second position with said cutting edge extending completely across and chordally intersecting the tubular section, the plane of said blade being constrained to lie substantially parallel to the plane constituted by said slot;

D. means for urging said blade mounting member to pivot said blade from said first to said second position while said guide housing is rotated about said support means; and

E. an arm, projecting generally radially outwardly from and secured to said guide housing, having engagement means, engageable by an operator to rotate said guide housing and draw said cutting edge of said blade about the cylindrical article in a circular direction following said pivot point.

---

**4,146,960**

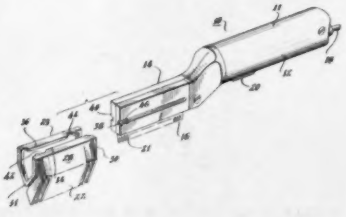
## THINNING COMB FOR POWERED HAIR TRIMMER

**Theodore R. Flowers, New Haven, and Antonio Pires, Wallingford, both of Conn., assignors to Sperry Rand Corporation, Bridgeport, Conn.**

**Filed Aug. 17, 1977, Ser. No. 825,334**

**Int. Cl.[2] B26B *19/22***

**U.S. Cl. 30—195** **10 Claims**



1. A thinning comb for a hair trimmer for thinning hair, said hair trimmer having an elongated row of cutter teeth for shear-

ing hair strands introduced between said cutter teeth, said thinning comb comprising;

a. an elongated comb member having a plurality of elongated comb teeth terminating at free end portions, said comb member including an elongated upper edge portion and an elongated ridge portion, said ridge portion being located intermediate said edge portion and the free end portions of said comb teeth, said comb teeth extending from said ridge portion at a transverse angle with respect to the length of said comb member, said free end portions of the comb teeth extending transverse of and beyond the row of cutter teeth,

b. means formed on said comb member for demountably positioning said comb member on said hair trimmer for transport therewith through hair to be thinned,

c. said comb teeth adapted for guiding hair strands toward said cutter teeth for introducing some of the guided hair strands between the cutter teeth,

d. means formed between alternate pairs of said comb teeth for inhibiting introduction of hair strands between some of said cutter teeth, and

e. means formed between and extending longitudinally of said alternate pairs of the comb teeth for imparting a rolling action to the hair strands guided by said alternate pairs of the comb teeth thereby providing a smooth combing and feeding action of the comb member upon transport through the hair to be thinned.

---

**4,146,961**

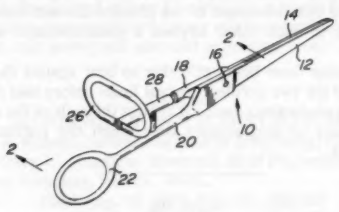
## SCISSORS

**Frank Pinto, 1832 Meadowbrook Rd., Abington, Pa. 19116**

**Filed Nov. 4, 1977, Ser. No. 848,531**

**Int. Cl.[2] B26B *13/12***

**U.S. Cl. 30—341** **8 Claims**




1. A pair of scissors comprising first and second blades pivoted together, each blade having a shank terminating in a loop, the loop on the first blade being a finger loop aligned generally along a plane of its shank, the loop of the second blade being a thumb loop lying generally perpendicular to the plane to its shank, said thumb loop being adjustable along its shank, a limit stop on one of the shanks for contacting the other shank in a closed position of said blades, said thumb loop being telescopically adjustable along its shank by means of a sleeve connected thereto and movable therewith, said thumb loop and its sleeve being retained in a predetermined position along its shank by means of said limit stop, said sleeve having an elongated slot, and a portion of said limit stop extending through said slot and being threadedly connected to the shank on said second blade.

---

**4,146,962**

## CHAIN SAW MILL

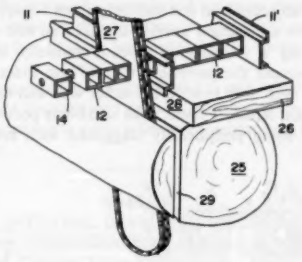
**George Grube, 14135 Olde Hwy. 80, El Cajon, Calif. 92021**

**Filed Mar. 27, 1978, Ser. No. 890,317**

**Int. Cl.[2] B27B *17/02***

**U.S. Cl. 30—371** **9 Claims**

1. Apparatus for guiding the cutting of wood by a chain saw which includes a chain saw bar, comprising a pair of guide members; a plurality of spacer members; bolt means for assembling said guide members, said spacer members, and the chain saw bar; said spacer members being selectively positionable to define a desired spacing interval between the chain saw bar and




at least one of said guide members; said at least one of said guide members including means for following a guide surface and maintaining the chain saw bar parallel thereto.

---

**4,146,963**

## DENTAL IMPRESSION TRAY

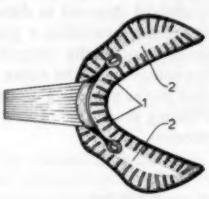
**Josephus Schreinemakers, Piuslaan 130, Eindhoven, Netherlands**

**Filed Oct. 19, 1976, Ser. No. 733,948**

**Claims priority, application Netherlands, Oct. 21, 1975, 7512346**

**Int. Cl.[2] A61C *9/00***

**U.S. Cl. 32—17** **2 Claims**




1. A perforated tray for taking an impression of a lower jaw, which may be dentulous or edentulous, said tray being provided with perforations which are shaped solely as elongated slits, which slits extend at least approximately transversely to the vestibular outline and to the lingual outline of the tray when viewed from above, the part of the tray, which covers in situ the top of the crest of the jaw, or the masticatory surfaces of the teeth, being left unperforated, two distinct rows of said perforations being formed on opposite sides of said unperforated portion of the tray, said slits being oriented on opposite sides of the unperforated regions to enhance escape of impression material and promote flow from the unperforated regions laterally toward the slits whereby inclusion of air is minimized, said slits having a width which increases from the operative inner surface to the non-operative outer surface of the tray.

---

**4,146,964**

## DENTAL HANDPIECE

**Joseph P. Lares, 111 Wellesley Crescent, Redwood City, Calif. 94062, and Albert J. Lares, 351 Grove Dr., Portola Valley, Calif. 94025**

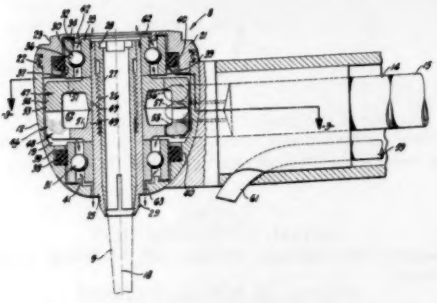
**Filed Aug. 9, 1976, Ser. No. 712,888**

**Int. Cl.[2] A61C *1/12***

**U.S. Cl. 32—27** **2 Claims**

1. A dental handpiece comprising a housing, a pair of bearings in said housing disposed coaxially on an axis, a shaft mounted in said bearings coaxially on said axis, a turbine runner including a pair of rotors on said shaft, each rotor having

a central hub at one end abutting a respective one of said bearings and at the other end abutting the hub of the other rotor in a common terminal plane, a pair of webs, each web extending adjacent said one end only from a respective one of said hubs in a direction normal to said axis and each of said webs having a plurality of circumferentially spaced blade portions around the periphery thereof and extending axially from each web only toward the other web and terminating in said common terminal plane, with said blade portions of one of said webs being peripherally staggered with respect to the



blade portions of the other of said webs and being radially spaced from said hubs to leave a central annular space between said blades and hubs, means on the trailing side of each of said blade portions defining a concave impact surface extending the axial length of said blade and disposed to direct air into said central annular space, means providing a plurality of inlet passages in said housing substantially tangent to said blade portions and extending substantially the entire axial height of both of said rotors, and means providing an outlet passage in said housing for air issuing from said central annular space between said blade portions.

---

**4,146,965**

## DRAWING INSTRUMENT

**Raymond A. Payton, Bewdley, England, assignor to Helix International Limited, West Midlands, England**

**Filed Jul. 19, 1977, Ser. No. 817,103**

**Claims priority, application United Kingdom, Nov. 19, 1976, 48257/76**

**Int. Cl.[2] B43L** *9/02, 8/20*

**U.S. Cl. 33—27 B** **9 Claims**

1. A drawing instrument comprising:

(a) pivot means connecting a pair of die-cast limbs together forming an assembly at the inner ends of said limbs,

(b) a bow top pivoted to the pivot means and having an interior hole and fork limbs having inside faces embracing the assembly of said inner ends,

(c) a centralizing member held between said inner ends of said pivoted die-cast limbs,

(d) said centralizing member including an elongated pivot receiving hole and first and second keying holes,

(e) said elongated hole receiving the pivot means,

(f) a first die-cast keying projection integrally formed at the inner end of a first one of said pivoted die-cast limbs,

(g) a first arcuate slot provided in said inner end of said first pivoted die-cast limb,

(h) a second die-cast keying projection integrally formed at the inner end of the second one of said pivoted die-cast limbs,

(i) a second arcuate slot provided in said inner end of said second pivoted die-cast limb,

(j) said first and second die-cast keying projections engaging said first and second arcuate slots, respectively,

(k) said first and second die-cast keying projections, respectively engaging said first and second keying holes in said centralizing member to key the centralizing member to said inner ends of the pivoted die-cast limbs,

(l) said centralizing member having a projection portion projecting up into said interior hole in the bow top,

(m) said projection portion being effective to press against a sidewall of said interior hole when there is angular movement of either pivoted die-cast limb to cause the bow top to turn and keep central, and

(n) shoulders being integrally formed on said inside faces and having stop faces engageable with said inner ends of said pivoted die-cast limbs,

(o) said stop faces being effective to act against angular opening out movement of the pivoted die-cast limbs with respect to each other beyond a predetermined angular limit,

(p) said stop faces being effective to bear against the inner ends of the two pivoted die-cast limbs before said die-cast keying projections can bear against the ends of the respective ones of said arcuate slots when the instrument is opened.

---

**4,146,966**

## ENGRAVING MACHINE FOR RINGS AND BANGLE BRACELETS

**Jack W. Levine, Levittown, N.Y., and Hans Bonheim, Fairlawn, N.J., assignors to New Hermes, Incorporated, New York, N.Y.**

**Filed Jun. 6, 1977, Ser. No. 803,508**

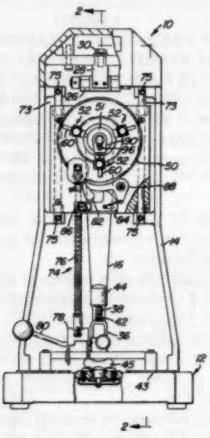
**Int. Cl.[2] B23C** *1/16*

**U.S. Cl. 33—24 B** **8 Claims**

1. An engraving machine comprising a frame having a base and an upright member, a lever means supported by said upright member, said lever means having a stylus and an engraving tool mounted thereon and being arranged such that movement of said stylus in a pattern produces a movement of the engraving tool corresponding to said pattern, a plate, means supporting said plate on said upright member for vertical movement and including means providing a pivotable connection permitting pivotable movement of said plate outwardly of said upright member to facilitate access to a rear surface of the plate, a peripherally indexable ratchet wheel mounted for rotary movement on said plate, a plurality of clamping chucks movably mounted on said ratchet wheel for holding a workpiece, and a means for simultaneously indexing said ratchet wheel and causing relative vertical motion between said workpiece and said engraving tool.

5. An engraving machine comprising a frame having an upright member and a base, a lever means supported by said upright member, said lever means having a stylus and an engraving tool mounted thereon and being arranged such that

movement of said sytlus in a pattern produces a motion of the engraving tool corresponding to said pattern, a work holder assembly supported by said upright member for vertical movement thereon, said work holder assembly having an indexable ratchet wheel mounted for rotary movement thereon, a plurality of movable clamping chucks mounted on said ratchet wheel for holding a workpiece, a portion of each of said chucks being



removable and interchangeable in order to adapt the machine to various sizes of workpieces, means for extending the effective length of said engraving tool so that it is capable of engraving on the inner peripheral surface of a ring workpiece having a diameter of at least 2 inches, and a means for indexing said ratchet wheel and for causing relative vertical movement between said workpiece and said engraving tool.

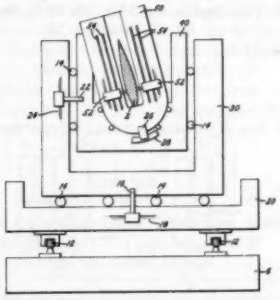
---

**4,146,967**

## ROTOR BLADE INSPECTION FIXTURE

**Martin J. Rohner, Springfield; George Olszewsky, Ridley Park, and Harry W. Hamilton, Broomall, all of Pa., assignors to The Boeing Company, Seattle, Wash.**

**Filed Aug. 15, 1977, Ser. No. 824,405**
**Int. Cl.[2] G01B** *5/24, 5/20, 7/30, 7/28*
**U.S. Cl. 33—174 C** **13 Claims**



1. An apparatus for determining the contours of a rotor blade having a pitch axis and having a multiplicity of airfoil sections along its span which comprises:

a frame adapted to be detachably connected to a predetermined airfoil section along the span of the rotor blade, the airfoil sections including a reference line passing substantially from the leading edge to the trailing edge of the airfoil, said frame being adapted to pivot about a line which is substantially coincident with the rotor blade pitch axis to enable said frame to be aligned with said reference line;

a first measuring means connected to said frame for determining the distance a preselected point on the surface of the rotor blade is located from the leading edge of said airfoil section along a line parallel to said reference line; and

a second measuring means connected to said frame for determining the distance said preselected point is located from said reference line along a line perpendicular to said reference line.

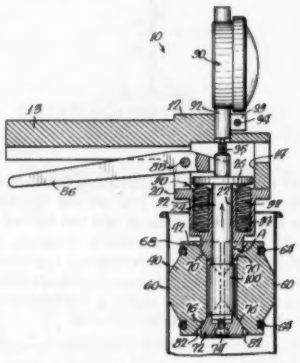
---

**4,146,968**

## INTERNAL DIAMETER GAUGE

**John M. Tovey, Circle Pines, Minn., assignor to National Can Corporation, Chicago, Ill.**

**Filed Sep. 12, 1977, Ser. No. 832,172**
**Int. Cl.[2] G01B** *5/12*
**U.S. Cl. 33—178 R** **12 Claims**



11. A gauge for measuring the internal diameter of a thin-walled container comprising: a pair of mandrel halves each having a semicircular peripheral surface, said surfaces cooperating with each other to define a circular surface of a diameter slightly less than said internal diameter; urging means urging said halves into engagement with each other, a fixed member having a first camming surface engaging one end of each of said mandrel halves, a movable member having a second camming surface engaging an opposite end of each of said mandrel halves, each of said camming surfaces including a pair of opposed inclined surfaces, each inclined surface being inclined a predetermined included angle with respect to said axis so that the relative movement of said first and second camming surfaces with respect to each other is a function of the diameter defined by the mandrel halves and which is a direct multiple of the internal diameter of the container, means for moving said camming surfaces relative to each other to move opposite ends of said mandrel halves in equal increments in response to relative movement of said camming surfaces along an axis for said mandrel halves so that said mandrel halves are moved radially of said axis, biasing means between said fixed member and said movable member normally biasing the first and second camming surfaces toward each other to cause said mandrel halves to be separated, and indicator means indicating the relative position of said camming surfaces with respect to each other.

---

**4,146,969**

## SURVEYOR'S ROD

**George O. Chaires, P.O. Box 5175, Tallahassee, Fla. 32301**

**Filed Nov. 7, 1977, Ser. No. 849,364**
**Int. Cl.[2] G01C** *15/08*
**U.S. Cl. 33—295** **5 Claims**

1. A selectively extendable surveyor's rod for use with a

sighting instrument located in a remote position, comprising a generally rectangular base member having a generally flat first wall and a second wall disposed at an angle to said first wall, a first threaded projection extending outwardly from said first wall, a second threaded projection extending outwardly from said second wall, a rod including a plurality of rod sections, each of said rod sections having means at each end for connecting the same in end-to-end relationship with each other, at least

one of said rod sections having a threaded recess at one end for selectively receiving said first and second threaded projections, and the uppermost section of said rod having flag means which is easily visible from a remote location, whereby a selected number of sections are connected together in end-to-end relationship so that said flag means extends above obstructions between the rod and the sighting instrument, and is visible from the sighting instrument.

---

**4,146,970**

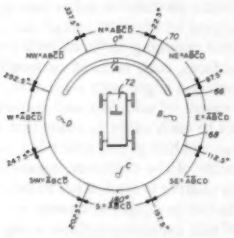
**REMOTE-INDICATING MAGNETIC COMPASS**

**Robert A. Edwards, 12 Notch Park Rd., Little Falls, N.J. 07424**

**Filed Dec. 26, 1973, Ser. No. 428,460**

**Int. Cl.[2] G01C *17/26***

**U.S. Cl. 33—363 K** **2 Claims**



1. A remote-indicating magnetic compass system for use by the general public in automobiles or the like comprising:

a housing;

a transparent viscous damping fluid filling said housing a compass magnet;

means rotatably mounting the magnet in the housing for response to the incident magnetic field of the earth;

compensation magnets in the vicinity of the compass for imposing an additional magnetic field to compensate for magnetic fields produced by an automobile; an encoder coupled to the compass magnet having a single light modulating arc; a continuous light source adjacent said encoder to illuminate said arc;

phototransistors arranged equally spaced on a circle parallel to the circle traversed by said arc such that single or adjacent pairs of phototransistors are illuminated by said light modulating arc; light annunciators corresponding to the number of phototransistor mounted to a map scale to indicate auto heading relative to map letters N. W. W. E. and; electric means directly connecting each phototransistor to a single light annunciator.

---

**4,146,971**

**METHOD OF PREPARING A RAPIDLY DISSOLVING POWDER OF STERILE CRYSTALLINE CEFAZOLIN SODIUM FOR PARENTERAL ADMINISTRATION**

**Michael Bornstein, and Michael D. Cise, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.**

**Continuation-in-part of Ser. No. 744,552, Nov. 24, 1976, abandoned. This application Dec. 14, 1977, Ser. No. 860,365**

**Int. Cl.[2] F26B *5/06***

**U.S. Cl. 34—5** **13 Claims**

1. A method of preparing sterile essentially crystalline cefazolin sodium for reconstitution for parenteral administration comprising the steps of:

(a) dissolving said cefazolin sodium in a solvent comprised of from about 2 to about 25 percent ethanol and from about 98 to about 75 percent water (v/v);

(b) filtering the solution from (a) through a sterilizing filter;

(c) cooling the sterile filtrate from (b) slowly over a period of from 3 to about 12 hours from room temperature to about −10° C.;

(d) cooling the preparation from (e) rapidly to a temperature of between −30° C. and about −40° C.;

(e) maintaining the temperature of the preparation from (d) below −30° C. for a period of from 1 to 2 hours;

(f) reducing the pressure of the environment in which the preparation from (e) is maintained to a maximum of 1 mm of mercury absolute;

(g) raising the temperature of the environment in which the preparation from (f) is maintained to a maximum of about 50° C., avoiding the melting of such preparation; and

(h) subliming the solvent from the preparation from (g) until the resulting crystals of said cefazolin sodium have a moisture content of not more than 6.0 percent, and a $C_1$–$C_3$ alcohol content of not more than 1.0 percent.

---

**4,146,972**

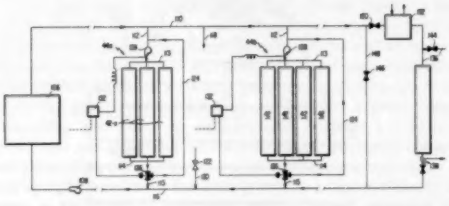
**CONTINUOUS WEB DRYING**

**Horace L. Smith, Jr., Richmond, Va., assignor to Smitherm Industries, Inc., Richmond, Va.**

**Continuation-in-part of Ser. No. 622,617, Oct. 15, 1975, abandoned. This application Mar. 25, 1976, Ser. No. 670,248**

**Int. Cl.[2] F26B *3/24***

**U.S. Cl. 34—41** **2 Claims**



1. A method of drying continuous webs of paper and the like comprising the steps of: mounting a plurality of rotary dryers in spaced apart relationship for rotation about parallel axes; circulating a high boiling point, non-aqueous heat transfer liquid through said dryers in liquid form to increase the external surface temperatures thereof; effecting a movement of the web to be dried through the zone in which the dryers are disposed; and bringing said web into contact with successive

ones of said dryers as it moves through said zone to thereby effect an evaporation of volatiles from said web, there being a sweat roll spaced from the last of the rotary dryers for cooling the dry product and said method including the step of altering the surface temperature of the sweat roll by circulating the same heat transfer liquid as is circulated through the rotary dryers through a heat exchanger to reduce its temperature and then circulating said heat exchange liquid through said sweat roll, the dryers and the sweat rolls being simultaneously operated as aforesaid.

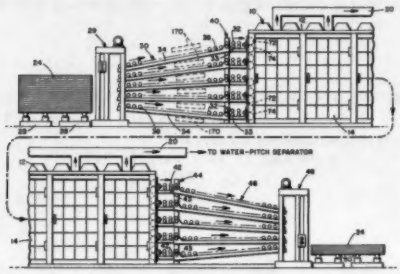
---

**4,146,973**

## METHOD AND APPARATUS FOR DRYING VENEER

**Leslie M. Steffensen, Springfield; H. Gary Dutell, Eugene, and Robert A. Rydell, Corvallis, all of Oreg., assignors to Georgia-Pacific Corporation, Portland, Oreg.**

**Filed Apr. 14, 1977, Ser. No. 787,535**
**Int. Cl.[2] F26B *3/32***
**U.S. Cl. 34—41** **15 Claims**




1. A method for drying sheets of veneer comprising the steps of:

establishing a vacuum condition in a drying chamber;

successively introducing a series of veneer sheets individually through an inlet into said drying chamber while sealing said sheets at said inlet to maintain the vacuum condition therein and moving said sheets continuously along a path through said drying chamber;

directly exposing substantially the entire face of both sides of each individual veneer sheet to radiant energy of the long wave infrared spectrum from radiant infrared emitters located on opposite sides of the path of the sheets in spaced relation thereto while said veneer sheets are moving along said path;

controlling the level of said radiation to which the sheets moving through said chamber under the prevailing vacuum condition are exposed to raise the surface temperature of said sheets to a level sufficient to dry the sheets but insufficient to result in damage thereto; and

thereafter withdrawing the dried sheets from said drying chamber through an outlet while sealing said sheets at said outlet to maintain a vacuum condition in said chamber.

---

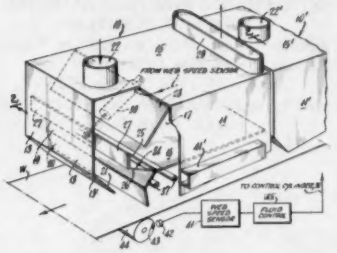
**4,146,974**

## DRYING APPARATUS

**Robert W. Pray, Greenwich Lodge, Greenwich, Conn. 06830**

**Filed Sep. 19, 1977, Ser. No. 834,335**
**Int. Cl.[2] F26B *3/28***
**U.S. Cl. 34—54** **6 Claims**

6. Apparatus for drying and curing moving webs comprising a rectangular housing having a forward wall and an open side, a partition in said housing substantially parallel to said open side, said partition partially dividing said housing into a first compartment and a second compartment, the latter having said open side, means for moving said web substantially parallel to and spaced from said open side, said partition having means cooperating with the forward wall to form a nozzle, heating means in said second compartment, an air inlet in said housing and an air outlet in said first compartment, an air valve in cooperative relationship with said partition to direct at least a major portion of said air from said inlet through said first




compartment to said outlet when in one position and to direct the major portion of the air from said inlet directly through said nozzle on to said web when in another position.

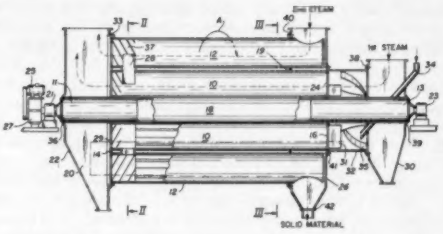
---

**4,146,975**

## ROTATING HEAT EXCHANGER

**Victor Duhem, Avon, France, assignor to Fives-Cail Babcock, Paris, France**

**Filed Jun. 6, 1977, Ser. No. 803,578**
**Int. Cl.[2] F26B *11/04***
**U.S. Cl. 34—134** **10 Claims**




1. A rotating heat exchanger comprising

a. an axle of rotation,

b. a first group of tubes arranged about the axle of rotation,

c. a second group of tubes arranged about the first group of tubes,

1. the tubes of the first and second groups having axes parallel to the axle of rotation and

2. each of the tubes having ports at respective ends thereof, the ports of the tubes of the first and second groups of tubes at each of the ends being substantially coplanar,

d. respective gas inlet and discharge chambers in communication with the ports at respective ends of the heat exchanger,

e. means for circulating a first stream of gas between the chambers through the tubes of the first group,

f. means for circulating a second and separate stream of gas between the chambers through the tubes of the second group,

g. means at one of the ends for supplying a solid granular material into the tubes of one of the groups,

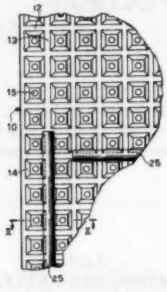
h. channel means near the other end for connecting the tubes of the first and second groups for passing the solid granular material from the one to the second group of tubes, and

i. outlet means at the one end for removing the solid granular material from the second group of tubes.

## 4,146,976
## MODULAR PANEL THAT CAN BE ASSEMBLED WITH OTHER SIMILAR PANELS, WHEREBY TO FORM MAGNETIC BOARDS FOR PROGRAMMING AND STATISTICAL PURPOSES

Franco Zambiasi, Milan, Italy, assignor to Tecno-Planning Italia Di Giulini e Zambiasi, Milan, Italy

Filed Oct. 19, 1976, Ser. No. 733,901
Claims priority, application Italy, Oct. 21, 1975, 28530 A/75
Int. Cl.[2] G09B *29/00*
U.S. Cl. 35—24 R 1 Claim



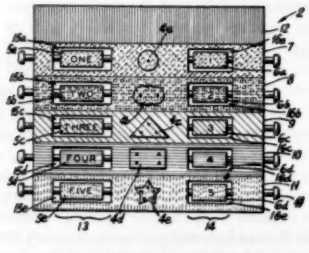
1. A magnetic board, for holding signalling elements and the like contemporaneously horizontally and/or vertically, the board comprising a plurality of panels made up of respective metal sheets, each of said metal sheets having (1) a first plurality of spaced, parallel grooves embossed thereon for receiving signalling elements therein and (2) a second plurality of spaced, parallel grooves embossed thereon for receiving signalling elements therein, said grooves of said second plurality of grooves being perpendicular to those of said first plurality of grooves to form a grating subdividing said panels by grating nodes having equal center-to-center distances; and means for coupling adjacent ones of said panels to one another; whereby signalling elements may be contemporaneously placed in the grooves in horizontal and vertical positions, and

wherein said means for coupling adjacent ones of said panels to one another comprise respective frames made of plastic material, holes being provided in said panels, and hot-riveted pins extending through said holes to secure ones of respective said panels to respective ones of said frames, said frames being formed with tongue-and-groove joints for coupling adjacent ones of said frames to one another.

## 4,146,977
## EDUCATIONAL TOY

Maryhannah S. Barberi, 42 Thornton St., Hamden, Conn. 06517

Filed Jan. 6, 1978, Ser. No. 867,472
Int. Cl.[2] G09B *1/20*
U.S. Cl. 35—77 10 Claims




1. An educational/toy device comprising:

a housing having formed therein at least four openings disposed to substantially form at least two adjacent columns of openings each having at least two openings laterally disposed from an opening in an adjacent column to form at least two rows of laterally aligned openings, said rows each being visually distinguishable;

drum mounting means;

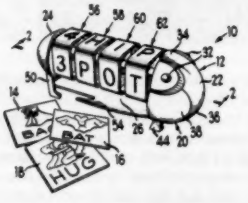
at least two adjacent columns of drums, each column having at least two drums each laterally disposed from a drum in an adjacent column and rotatably mounted by said drum mounting means within said housing for separate rotation thereof from the exterior of said housing and being viewable through said openings, each drum in a column having at least one indicia on its peripheral surface corresponding to an indicia on the peripheral surface of a drum in the other column, each said corresponding indicia being integrated with a similar color to enable lateral alignment of similar colors and to thereby enable lateral alignment of the corresponding indicia on the peripheral surfaces of the drums with separate rotation of the drums; and

at least two tactile figures each affixed to said housing to enable lateral alignment of corresponding indicia and tactile figures.

## 4,146,978
## AMUSEMENT DEVICE FOR SPELLING EDUCATION

Jeffrey D. Breslow, Highland Park, Ill., assignor to Marvin Glass & Associates, Chicago, Ill.

Filed Aug. 17, 1977, Ser. No. 825,196
Int. Cl.[2] G09B *1/20*
U.S. Cl. 35—77 4 Claims




1. A game apparatus suitable for use in spelling education to provide a player with a plurality of attempts to spell a word, comprising frame means including an elongated horizontal shaft extending between opposite end portions which are adapted to rest on a surface, first chance means comprising numerical indicating means for randomly dictating a number of player attempts, second chance means comprising alphabetical indicating means for randomly dictating a letter position, and third chance means comprising a plurality of chance elements, each having a plurality of identical alphabetical indicating means thereon in a combination to define a recognizable word, said first and second chance means being mounted on a plurality of spinner elements, each of which is rotatably mounted on said shaft between the opposite end portions and adapted for free manual rotation thereon, each of said spinner elements including means defining a polygonal shaped centrally disposed opening for said shaft and a similarly shaped polygonal outer surface, the outer surface of a first of said spinner elements being provided with said first chance means and the outer surfaces of a plurality of said other spinner elements being provided with said second chance means, whereby the polygonal shape of said centrally disposed opening requires that only one of said first chance means and a plurality of said second chance means are aligned in a predetermined orientation after one or more of said spinner elements is rotated, said means defining said centrally disposed openings including peripheral surfaces which are longer, in the direction parallel to the axis of the shaft, than the length of the outer surfaces of the spinner elements in the same direction to substantially reduce friction between the spinner elements during relative rotation between the same, said end portions being intercon-

nected by a bottom element parallel to said shaft and spaced below said spinner element and said bottom element mounting a plurality of feet extending downwardly of said bottom element, said end portions being shaped to resemble the head and tail portions of a bee-like insect.

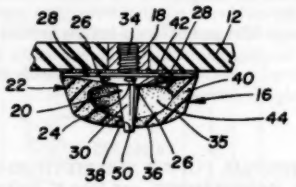
---

**4,146,979**

## SELF-CLEANING GOLF-SHOE CLEAT

**Gilbert R. Fabbrie, 6401 Warner, No. 504, Huntington Beach, Calif. 92647**

**Filed Oct. 25, 1977, Ser. No. 844,894**
**Int. Cl.[2] A43C *15/00*; A43B *5/00***
**U.S. Cl. 36—67 D** **4 Claims**




1. In combination with a golf shoe tht has a sole in which a plurality of spaced plugs are embedded, each of which plugs includes a tapped bore substantially normal to said sole, a plurality of golf cleats that are operatively associated with said plugs, each of said golf cleats including:

a. a rigid flange of substantially greater transverse cross-section than that of said plug;

b. an externally threaded rigid boss tht extends outwardly from said flange and engages said tapped bore;

c. a rigid spike that extends outwardly from said flange and engages said tapped bore;

c. a rigid spike that extends outwardly from said flange in a direction opposite to that of said boss, said spike having a tapered external surface and a free end portion;

d. a molded body of resilient material that includes a first portion in the form of a flat wall in which said flange is embedded and from which said threaded boss projects, and a second wall portion that projects from said first wall portion and cooperates therewith to define a cavity across which said spike extends, and a circular lip opening in said second wall portion that snugly engages said external tapered surface of said spike adjacent said free end thereof when there is no pressure exerted on said resilient body in a direction towards said first wall portion thereof, with said second wall portion deforming towards said first wall portion when subjected to upward pressure as occurs when the user of said golf shoe walks on earth sufficiently soft as to be penetrated by said spike, and said second wall portion when said upward pressure is relieved by said shoe being lifted from the ground returning to its initial configuration and in so doing said lip wiping foreign material from said spike.

---

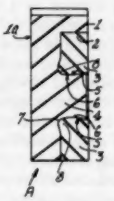
**4,146,980**

## FOOTWEAR

**Evelyn Cross, 53 First St., Linden, Johannesburg, South Africa (2195)**

**Filed Jun. 7, 1977, Ser. No. 804,362**
**Claims priority, application South Africa, Jun. 10, 1976, 76/3451**
**Int. Cl.[2] A43B *21/34***
**U.S. Cl. 36—39** **1 Claim**

1. An article of footwear including a heel, at least a portion of the heel which presents a rear ground engaging zone of the heel being annular, another portion of the heel comprising a spigot having an annular concave side surface, said annular portion of the heel having an annular convex inner surface complementary to said annular concave side surface of said spigot, said annular portion being rotatable on and relative to said spigot when said footwear is in use and said annular portion is pressed against the ground, said annular portion having an annular ridge about its inner periphery that extends upwardly above the level of the remainder of said annular portion and that fits in a complementary downwardly opening groove that surrounds the base of said spigot, said spigot being slightly shorter in length that the thickness of said annular portion to avoid engagement of the lower end of the spigot with the ground.



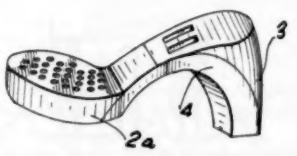

---

**4,146,981**

## FOOTWEAR STRUCTURE WITH INTERCHANGEABLE ELEMENTS

**Leandre Renaldo, via S. Marco, Padova, Italy**

**Filed May 11, 1976, Ser. No. 685,235**
**Int. Cl.[2] A43B *3/24*; A43C *15/00*; A43B *13/28, 21/36***
**U.S. Cl. 36—100** **1 Claim**




1. Footwear construction with interchangeable elements comprising a ball portion having a downwardly facing treading surface and an upwardly facing insole surface, a heel portion having a treading face and an insole top and a shank portion having an upwardly facing insole face, wherein according to the improvement

the ball portion is formed as a separate element and includes as an integral part thereof a first segment of said shank portion extending upwards from the insole surface level of said ball portion and having an upwardly inclined first mating surface formation facing said shank portion and a second top mating surface formation extending transverse to said first mating surface formation,

said shank portion has an arcuated shape with downwardly facing concavity and is formed as a separate element and includes integral therewith a segment of said ball portion extending from said shank portion downwardly from a level thereof corresponding to the level of said insole surface and having at its end adjacent said ball portion a first treading face in assembled condition flush with said treading surface of said ball portion, said shank portion having a sloping third mating surface formation for mating engagement with said upwardly inclined first mating surface formation and an upwardly protruding land formation in an intermediate position of said shank portion and having an upper surface coinciding with said insole face, said land formation having a first shoulder facing said top mating surface formation and a second shoulder opposite thereto, and wherein said shank portion formed as a separate element includes further integral therewith a segment of said heel portion sloping downwardly from a level thereof

corresponding to the level of said insole top and having a treading bottom surface thereof, said shank portion having a further arcuated upwardly convex mating surface formation extending from said land formation thereof and recessed thereto, over said heel portion segment up to said treading bottom surface thereof and wherein

said heel portion is formed as a separate element and includes as an integral part thereof a second segment of said shank portion extending in assembled condition from said land formation over said upwardly convex mating surface of said shank portion and having an abutment edge abutting in assembled condition against said second shoulder and wherein said heel portion segment integral with said shank portion has a downwardly concave mating surface formation engaging in assembled condition said upwardly convex mating surface formation facing said mating concave surface and complementar thereto, said first mating surface formation, said sloping third mating surface formation and said upwardly convex mating surface formation and said downwardly concave mating surface formation having respective groove and tongue engagement means for respective mutual detachable engagement therewith.

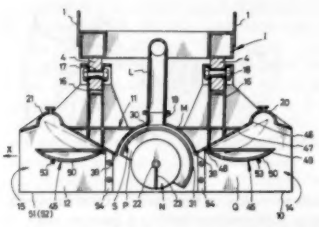
---

**4,146,982**

## PUMP-TYPE SLUDGE DREDGING APPARATUS

**Makoto Norisugi, Kawasaki, Japan, assignor to Toa Harbor Works Co., Ltd., Tokyo, Japan**

**Filed May 26, 1977, Ser. No. 800,930**
**Int. Cl.[2] E02F *3/92***
**U.S. Cl. 37—64** **7 Claims**



1. A dredging apparatus for removing sludge on a water bottom comprising:

(A) a pump dredger having a ladder assembly, said ladder assembly being pivotally supported at its one end at a fulcrum mounted to said pump dredger with its other end movable in water;

(B) a sludge suction pump provided in at least one of said ladder assembly and said pump dredger;

(C) a suction pipe connected at its one end to said suction pump and extending to the movable end of said ladder assembly; and

(D) a suction unit pivotally mounted through a pin at a portion of said movable end of the ladder assembly and having the other end of said suction pipe connected thereto, said suction unit comprising:

(a) a main body essentially composed of a cover or flat plate member and two side walls altogether arranged in a sectional configuration substantially corresponding to an inversed U-letter shape in a direction perpendicular to the longitudinal direction in which the ladder assembly extends from the pump dredger;

(b) a hood-like member expanded or flared toward below and secured at a central portion of said cover member of the main body in communication with the suction pipe, defining an opening for collecting diluted sludge therein and guiding the same into the pipe;

(c) a rotatable member comprising a rotatable shaft and vanes mounted thereon, the axis of said rotatable member being directed substantially perpendicular to the face of said side walls of the main body, said rotatable shaft being disposed below said hood-like member;

(d) a sludge collector means disposed between the hood-like member and the rotatable member and having a structure corresponding to a cylindrical container longitudinally with a portion thereof removed away, formed by a curved surface plate and two end plates respectively disposed at a longitudinal end, said sludge collector means being rotatable coaxial with said rotatable member;

(e) a sludge inlet formed below the hood-like member for taking sludge into a lower portion of the hood-like member by means of the rotary movement of said curved surface plate of the sludge collector means; and

(f) a movable vane member forming an upper wall of said sludge inlet and having a hollow arcuate configuration in longitudinal section; whereby as the suction unit is moved either forwardly or backwardly the dredging of sludge is carried out.

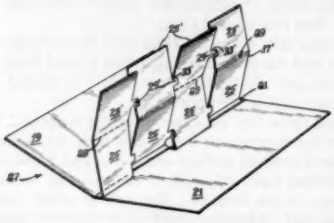
---

**4,146,983**

## PROMOTIONAL POP-UP AND METHOD OF MAKING

**Ib Penick, Prospect Heights, and John K. Volkert, Northfield, both of Ill., assignors to Compak Systems, Inc., Northfield, Ill.**

**Continuation-in-part of Ser. No. 638,558, Dec. 8, 1975, Pat. No. 3,995,388. This application Dec. 1, 1976, Ser. No. 746,340**
**Int. Cl.[2] G09F *1/00***
**U.S. Cl. 40—124.1** **12 Claims**



1. An item of the character described which comprises

a pair of base panels of sheet material which are hinged to each other along a straight line and

a coupon-carrying panel including a plurality of side-by-side coupons which are generally defined by slit means therebetween,

said coupon-carrying panel having tab means formed therein corresponding in number to the number of said coupons, and

said coupon-carrying panel being disposed between said base panels and each tab means being joined in surface contact to an opposite base panel from that to which the adjacent tab means is joined,

whereby opening of said item causes said plurality of coupons to stand up from the respective planes of said base panels with adjacent coupons disposed in substantially different planes.

---

**4,146,984**

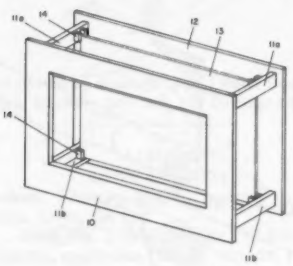
## STRUCTURAL ASSEMBLY FOR DISPLAY OF PICTORIAL MATTER

**Carl G. Lindquist, 230 Foster St., Littleton, Mass. 01460**

**Filed Aug. 4, 1976, Ser. No. 711,637**
**Int. Cl.[2] G09F *1/12***
**U.S. Cl. 40—152** **12 Claims**

1. A structural assembly for display of pictorial matter in any choice of a variety of uni-planar, multi-planar, curvilinear, or combined curvilinear and planar dispositions comprised of a

front frame such as may be produced from sheet stock and having an inner cut-out area constituting a viewing window with a first set of dimensions, to either face of which front frame a mat sheet, or equivalent, with equal or smaller viewing window dimensions optionally may be attached, a back panel disposed rearwardly of said front frame and spaced therefrom by four corner posts attached at one end to said front frame adjacent the corners of, and wholly outside of, a rectangle encompassing said cut-out area, and at the other end to said back panel, said corner posts of lengths not substantially less than one-twelfth the square root of the area of said rectangle, each adjacent pair of said corner posts having outer longitudinal surfaces lying in a common plane, means to locate and retain each of four corners of prepared pictorial matter in the



proximity of an inner surface of the corresponding corner post at any of a plurality of distances measured from said front frame toward said back panel, the chosen dimensions of the viewing window being sufficiently large to fully display that central portion of the image it is desired to display but sufficiently smaller than those of the image of the pictorial matter, taking account of the disposition and depth of recess behind the viewing window of said image, so that a viewer in a generally central location but not substantially closer than an average viewing distance will see with each eye only a portion of said image, both such portions having their edges as defined by the projection of the viewing window upon the image along the viewer's lines of sight everywhere within the outer edges of said image.

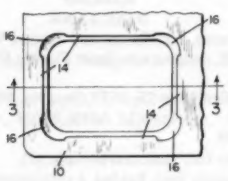
---

**4,146,985**

## X-RAY FILM MOUNTS

**Herman Margulies, Millburn, N.J., assignor to Sterling Drug, Inc., New York, N.Y.**

**Filed Jun. 13, 1977, Ser. No. 805,926**
**Int. Cl.[2] G09F 1/10**
**U.S. Cl. 40—158 B** **5 Claims**



1. A mount for X-ray films comprising a sheet of material having an opening therein, a depression about the edges of said opening, said depression including an inwardly directed flange forming a smaller window below the plane of the sheet,

a series of elongated, non-flexible lips in the plane of the sheet of material extending into said opening, but terminating short of the edges of the flange, said lips being peripherally spaced about said opening at each of the four sides thereof and extending into said opening to a lesser degree than does the depressed flange aforesaid, the elongated lips forming a co-planar discontinuous flange parallel to the depressed flange, and having forward edges which are rounded along their length and are parallel to the edges of and facing said opening to thereby offer a cam surface to film being inserted into the opening.

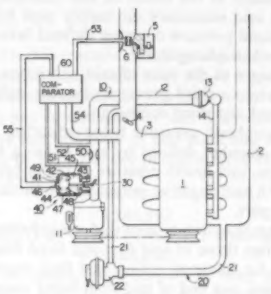
---

**4,146,986**

## DEVICE FOR SUPPLYING SECONDARY AIR FOR PURIFYING EXHAUST GASES DISCHARGED FROM INTERNAL COMBUSTION ENGINE

**Tokio Kohama, Nishio; Hideki Obayashi, Aichi; Tadashi Ozaki, Nishio, and Hidetaka Nohira, Susono, all of Japan, assignors to Nippon Soken, Inc., Nishio and Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, both of, Japan**

**Filed Nov. 24, 1976, Ser. No. 744,824**
**Claims priority, application Japan, Dec. 25, 1975, 50-157239; Mar. 26, 1976, 51-34021; May 26, 1976, 51-60935**
**Int. Cl.[2] F01N 3/10**
**U.S. Cl. 60—290** **6 Claims**




1. A device for supplying secondary air for purifying exhaust gases discharged from an internal combustion engine comprising

(a) a secondary air supply pipe in communication with an exhaust manifold or pipe of said engine,

(b) means for supplying secondary air through said secondary air supply pipe into said exhaust manifold or pipe,

(c) secondary air control valve means disposed in said secondary air supply pipe for controlling the flow rate of the secondary air flowing therethrough,

(d) means for detecting the volume of intake air to said engine,

(e) means for detecting the volume of the secondary air flowing through said secondary air supply pipe, and

(f) means responsive to the signal representative of the detected volume of intake air and the signal representative of the detected volume of secondary air for controlling said secondary air control valve means in such a way that the volume of the secondary air supply may be in proportion to the volume of intake air;

said means for controlling said secondary air control valve means comprising:

(a) a comparator responsive to said signal representative of the detected volume of intake air and said signal representative of the detected volume of secondary air for generating a control signal, and

(b) actuating means responsive to said control signal for controlling said secondary air control valve means;

said means for detecting the volume of intake air being adapted to detect the negative pressure at the venturi of a carburetor of said engine,

said means for detecting the volume of secondary air is adapted to detect the pressure difference across a restriction means inserted in said secondary air supply pipe,

said comparator further includes

a negative pressure pipe intercommunicating said actuating means and an intake manifold or pipe of said engine,
a vent for communicating said negative pressure pipe with the surrounding atmosphere, and
negative pressure control valve means adapted to be displaced in one direction in proportion to the negative pressure at the venturi and in the other direction in proportion to said pressure difference across said restriction means for controlling the opening degree of said vent, and

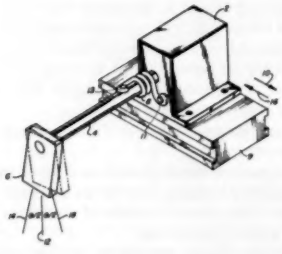
said actuating device is actuated in response to the negative pressure of intake air which is transmitted through said negative pressure pipe and regulated by said negative pressure control valve means;

said comparator comprising:

(a) a housing,
(b) first, second and third diaphragms disposed within said housing for dividing it into four pressure chambers,
(c) said negative pressure at said venturi being admitted into a first pressure chamber defined by said housing and said first diaphragm,
(d) the pressure at the outlet of said restriction means inserted in said secondary air supply pipe being admitted into a second pressure chamber defined between said first and second diaphragms,
(e) the pressure at the inlet of said restriction means being admitted into a third pressure chamber defined between said second and third diaphragms,
(f) the atmospheric pressure being admitted into a fourth pressure chamber defined by said housing and said third diaphragm, said fourth pressure chamber being communicated with said negative pressure pipe through a communication port,
(g) the pressure acting area of said second diaphragm being smaller than those of said first and third diaphragms,
(h) a shaft for interconnecting said first, second and third diaphragms, one end of said shaft being connected to said first diaphragm while the other end being extended into said fourth pressure chamber, and
(i) a valve body attached to said other end of said shaft in opposed relation with said communication port for controlling the degree of opening of said communication port.

---

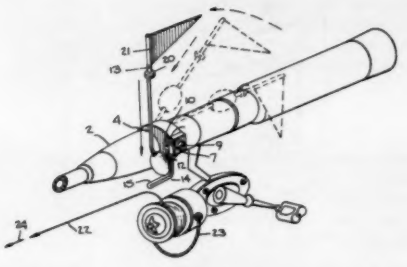
**4,146,987**
**IMPULSE ACTIVATED COUNTING DEVICE**
**Colin M. Hudson, Moline, and William L. Andre, Ben Lomond, both of Calif., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.**
**Filed Nov. 1, 1976, Ser. No. 737,867**
**Int. Cl.[2] G06M *1/00*; F41F *27/00***
**U.S. Cl. 42—1 E** **6 Claims**



1. An impulse activated counting device including:
a weight having an eccentric center of mass mounted for free pivoting movement in response to application of an external impulse force of a predetermined magnitude in either of two directions,
a rotatable shaft having said weight connected thereto and reactable to pivoting movement of said mass when said impulse forces are applied, said shaft being connected to a counter mechanism of said counting device to activate said counter mechanism when successive impulse forces in both directions have been applied, and,
means resiliently interconnecting said shaft with said counting device for controlling the degree of rotational motion of said shaft in response to pivoting movement of said weight.

---

**4,146,988**
**FISHING ROD TIP-UP**
**Edward J. Bednarczyk, 12 Riverview Pl., Yonkers, N.Y. 10701**
**Filed Jan. 9, 1978, Ser. No. 868,140**
**Int. Cl.[2] A01K *97/12***
**U.S. Cl. 43—17** **5 Claims**



1. A tip-up device for use on a fishing pole for signaling a fish strike and for releasing the fishing line comprising the combination of:
an elongated signal member,
means for releasably attaching the signal member to the fishing pole,
means pivotally attaching one end of said signal member to said attaching means,
means for releasably holding the fishing line on said signal member adjacent to the pivotal attachment for holding the fishing line when said rod member is turned generally parallel to the fishing pole and for turning the signal member and for releasing the fishing line when a fish strike turns the signal member to a position generally at right angles to the fishing pole, and
a weight slidably contained on said signal member for movement between a hold-down position near the outer end of the signal member and a release position adjacent to said line holding means, and
an adjustable stop member on said signal member for setting the outermost position of said weight.

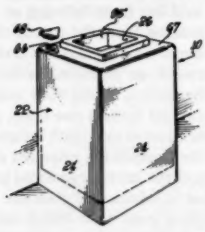
---

**4,146,989**
**BAIT TANK**
**Anthony M. Vanus, Alta Loma, and Jerome W. Vanus, Ontario, both of Calif., assignors to Sport Fishing Fineries, Inc., Costa Mesa, Calif.**
**Filed May 25, 1977, Ser. No. 800,350**
**Int. Cl.[2] A01K *97/04***
**U.S. Cl. 43—55** **15 Claims**

1. A live fish bait tank comprising:
an inner storage tank having a continuous cylindrical wall defining a storage chamber, the upper end thereof defining an access opening,
a cover housing adapted to be positioned over said inner storage tank,
means formed on said cover housing and positioned within said access opening of said storage tank, to prevent water stored therein from escaping therefrom,
means defining an inlet passage adjacent to said cylindrical wall of said tank and within said cover housing, said wall defining at least one opening communicating between the

passage and the storage chamber for passage of water therethrough into said storage chamber,

an outlet system connected to said cylindrical wall and spaced from said inlet system, and



means for providing drainage of said water from said storage chamber, whereby said tank can be emptied.

---

**4,146,990**

## SAFETY CATCH

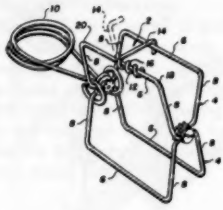
**Frank Conibear, Victoria, Canada, assignor to Woodstream Corporation, Lititz, Pa.**

**Filed Feb. 2, 1977, Ser. No. 764,856**

**Claims priority, application Canada, Nov. 23, 1976, 266323**

**Int. Cl.[2] A01M *23/24***

**U.S. Cl. 43—88** **3 Claims**



1. In combination, a rotating frame animal trap of round wire stock, the trap having two similar frames each frame having jaw forming sides and ends extending between the sides to support the jaws, and a safety catch comprising:

a helix of an internal diameter about equal to the external diameter of the round wire stock of the frame, the helix fitting around a first frame of the trap, the spacing of the coils of the helix being at least equal to the diameter of the wire stock; and

a hook extending outwardly from the helix for engaging the second frame of the trap to prevent rotation of the frames.

---

**4,146,991**

## TOY TRACKWAY

**Hiroshi Sano, Tokyo, Japan, assignor to Tomy Kogyo Co., Inc., Tokyo, Japan**

**Filed Jan. 28, 1977, Ser. No. 763,517**

**Claims priority, application Japan, Apr. 22, 1976, 51-50388[U]**

**Int. Cl.[2] A63H *18/06***

**U.S. Cl. 46—202** **10 Claims**

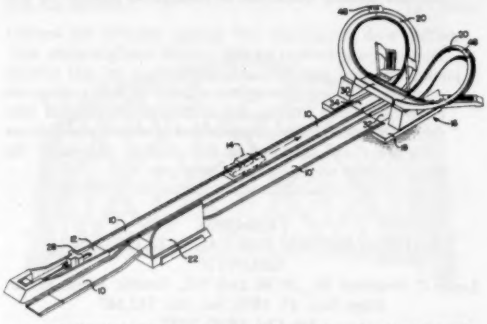
1. An amusement device, comprising:

a platform having an upper level and a lower level, a first trackway on said upper level along an axis and terminating in ends, second and third trackways on said lower level along axes and terminating in ends, said axes of said second and third trackways being generally parallel, said axis of said first trackway being generally perpendicular to said axes of said second and third trackways and spaced therefrom, first locking means provided at said ends of said first, second and third trackways,

fourth and fifth flexible trackways terminating in ends, second locking means provided at said ends of said fourth and fifth trackways, and

sixth and seventh trackways terminating in ends, third locking means provided at at least one of said ends of each of said sixth and seventh trackways, and

said first locking means being complementary to said second



and third locking means enabling said ends of said trackways associated therewith to be joined together such that said ends of said fourth and fifth flexible trackways may be joined to any of said ends of said first, second and third trackways and said ends of said sixth and seventh trackways may be joined to any of said ends of said second and third trackways.

---

**4,146,992**

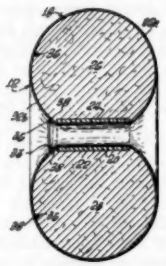
## VEHICLE WITH STUFFED WHEEL, AND METHOD OF MAKING

**Marjorie A. M. Smith, 7929 Stewart & Gray #10, Downey, Calif. 90241**

**Filed Jun. 24, 1976, Ser. No. 691,451**

**Int. Cl.[2] A63H *17/26***

**U.S. Cl. 46—221** **16 Claims**



1. A wheeled toy comprising:

a body,

at least one wheel comprising a hollow thin-walled pliant toroidal tube having a central opening bounded circumferentially by an inner annular wall portion of said tube, a relatively rigid sleeve contained within the interior of said tube in surrounding relation to said inner annular wall portion, and a pliant stuffing material filling said tube interior about said sleeve, and

means rotatably mounting said wheel on said body for rotation about the axis of said central tube opening including an axle secured to said body and extending through said central opening in supporting relation to said sleeve with said inner annular wall portion disposed between said axle and sleeve.

15. The method of fabricating a wheel for a wheeled toy comprising the steps of:

selecting a relatively rigid sleeve and a rectangular piece of thin pliant sheet-like material,

drawing said sheet material through and about the wall of said sleeve into an open-ended annular tubular configuration having an annular centerline and wherein a first pair of opposite edges of the sheet material encircle the axis of said sleeve in contiguous relation to one another and a second pair of opposite edges of the sheet material encircle said annular centerline in contiguous relation to one another,

stuffing with a relatively soft spongy material the annular interior space formed by said tubular configuration, and

joining the first pair of contiguous edges of said tubular configuration and joining the second pair of contiguous edges to form a hollow thin-walled pliant torodial tube filled with said stuffing material and containing said sleeve with the sleeve disposed in surrounding relation to the inner annular wall portion of said tube.

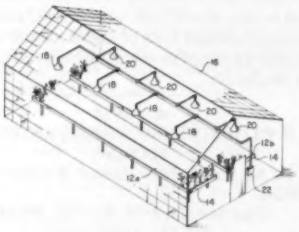
---

**4,146,993**

## LIGHTING SYSTEM FOR FACILITATING PLANT GROWTH

**Leslie C. Freeman, Sr., 10730 15th NE., Seattle, Wash. 98125**

**Filed Nov. 17, 1976, Ser. No. 742,547**
**Int. Cl.[2] A01G 7/00**
**U.S. Cl. 47—17** **5 Claims**



1. An apparatus for facilitating plant growth, comprising:

a first plurality of electric lamps interconnected by a first circuit such that all of said lamps are illuminated when said first circuit is energized, said lamps being spaced apart along a first row above plants to be illuminated;

a second plurality of electric lamps interconnected by a second circuit such that all of said lamps are illuminated when said second circuit is energized, said second plurality of lamps being spaced apart along a second row parallel to and spaced from said first row by a distance such that the light from said first and second plurality of lamps strikes said plants on substantially opposite sides, the lamps of each plurality of lamps being spaced along said first and second rows approximately equidistant from adjacent lamps with the lamps in the two rows being offset so that, in the direction of the rows, the lamps of one row are located substantially equidistantly between the lamps of the other row; and

control means for automatically energizing said first and second circuits at a cycle duration of between 1 hour/cycle and 6 hours/cycle such that each of said circuits are energized for a period of between ½ and 3 hours/cycle to allow said plants to react in response to light from said alternately energized lamps.

---

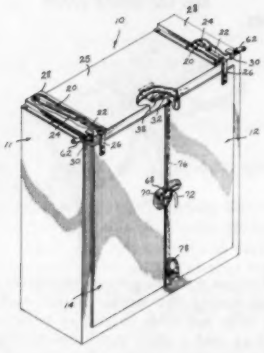
**4,146,994**

## DOOR HAVING IMPROVED CLOSING AND LATCHING SYSTEMS

**Clarence E. Williams, 2122 W. 450 N, LaPorte, Ind. 46350**

**Continuation-in-part of Ser. No. 757,979, Jan. 10, 1977, abandoned. This application Jan. 12, 1978, Ser. No. 868,905**
**Int. Cl.[2] E05C 7/05**
**U.S. Cl. 49—367** **6 Claims**

1. A door construction comprising a frame having upper and lower and spaced side parts, a pair of doors supported by said frame, one of said doors hinged at one side edge to said frame, the other of said doors hinged at one side edge to said frame, first and second generally vertically oriented rods carried by said one door adjacent the other side edge of the door, guide means for said rods wherein said first rod is shiftable generally axially relative to said one door between an extended position with one end protruding from the top of the door and a retracted position wherein said second rod is shiftable relative to said one door between an extended position with one end protruding from the bottom of the door and a retracted position, latch means carried by said one door, means connecting the other end of each rod to said latch means for movement of the rods between their respective extended and retracted positions upon rotation of the latch means, said latch means having an opening position in which said rods are in their retracted positions and a locking position in which said rods are in their extended positions, said latch means including retainer means engageable with the other of said doors when said doors are each in a closed position and said latch means is in its locking position, biasing means associated with said latch means for urging the latch means into its locking position, a socket in each of said frame upper and lower parts, said rod one ends protruding lockingly into said sockets when said latch means is in its locking position, catch means carried by said one door for engaging one of said rods when said latch means is rotated into its opening position to releasably secure the latch means in its



opening position and the rods in their retracted positions, said frame including trip means for contacting said one rod and disengaging said one rod from said catch means when said one door is closed with said latch means in its opening position whereby said biasing means will urge the latch means into its locking position and cause said rod one ends to enter said frame sockets and said retainer means to engage said other door in its closed position, closure means associated with each door for normally urging each door into its closed position, shiftable prop means associated with said one door for maintaining said one door in a partly closed position until the other door is in its closed position, said prop means including a bar member, means connecting said bar member to either said upper or lower frame parts for longitudinal movement relative to the frame into a first position wherein one end of said bar member is shifted toward one frame side part and a second position relative to the frame wherein the other end of said bar member is shifted toward the other frame side part, spring means connected between said bar member and frame for urging said bar member into its first position, said bar member one end including a projection part which contacts said one door and maintains said one door in its partly closed position when said bar member is in its first position, said bar member other end including a protruding camming means contacted by the other door when said other door is closed for urging said bar member into its second position to permit said one door to close.

4,146,995

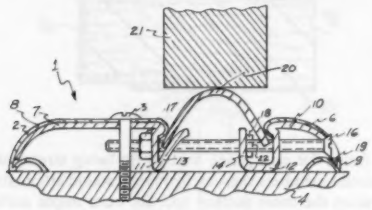
## ADJUSTABLE THRESHOLDS AND METHODS OF MAKING AND USING THE SAME

Robert E. Britt, 11 Cumberland, Maryland Heights, Mo. 63042

Continuation-in-part of Ser. No. 582,979, Jun. 2, 1975, Pat. No. 4,003,162. This application Nov. 1, 1976, Ser. No. 737,695

Int. Cl.[2] E06B *1/70*

U.S. Cl. 49—468 1 Claim



1. An adjustable threshold for use in door openings comprising,

first and second separate elongated partial threshhold sections, said sections provided with an elongated recess of "V" and of "U" shaped cross section respectively disposed such that each recess opens upwardly,

fastening means to secure said first section to the floor of said door opening,

elongated flexible and resilient center section means operably mounted in said recesses in said first and second sections and disposed therebetween,

adjusting means operably coupled to said first and second sections and disposed therebetween comprising, bolt means extending through said first and second section means, nut means attached to said first section and near the threaded end of said bolt and C-ring means removably attached to and disposed about said bolt means and disposed within the "U" shaped recess in the section nearest the head end of said bolt means.

---

4,146,996

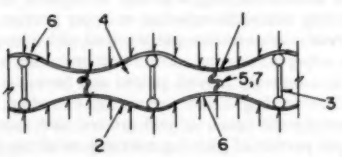
## THERMO-VACUUM STRUCTURE

Tore O. Arnesen, 514 S. 52nd St., Omaha, Nebr. 68106

Filed Oct. 18, 1977, Ser. No. 843,269

Int. Cl.[2] E04B *1/345*

U.S. Cl. 52—2 2 Claims




1. The Thermo-vacuum structure provides a relatively energy-efficient shelter from the natural environment and is comprised of: an outer and inner fabric skin which is separated by an interstitial space; and a load bearing rigid space form contained between the above mentioned skins; and fabric hangers connecting the outer and inner fabric skin; and a partial vacuum induced by one or more vacuum pumps and contained within the interstitial space.

4,146,997

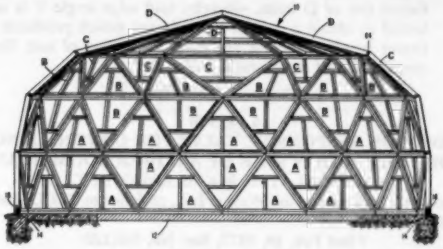
## DOMICAL-TYPE STRUCTURE

Lionel J. Diethorn, Belle Vernon, Pa., assignor to M. Ted Raptes, Arlington, Va.

Continuation-in-part of Ser. No. 399,253, Sep. 20, 1973, abandoned. This application Aug. 29, 1977, Ser. No. 828,484

Int. Cl.[2] E04B *1/32, 7/08*

U.S. Cl. 52—81 6 Claims



1. A circular domical type structure constructed from four basic triangular, rigid structural units A, B, C and D, wherein each structural unit is an isosceles triangle having a predetermined desired thickness, a planar outer surface, an inner surface, and predetermined dimensional lengths for the equal and third sides, and wherein each of said equal and third sides of said triangular unit have a predetermined acute edge angle as measured inwardly from the plane of said outer surface; said four basic units being interrelated in their respective dimensional side lengths and acute side edge angles; said units A, B, C and D each having the following dimensional side lengths:

a. units A, B, and C have lengths E on their equal sides,

b. unit A has third side length F, unit B has third side length G, units C and D have third side length H, and unit D has length I on its equal sides;

said units A, B, C and D each having the following acute side edge angles:

c. units A and B have edge angles X on all three sides and unit C has edge angle X on the equal sides;

d. units C and D have edge angles Y on the third sides,

e. unit D has edge angle Z on its equal sides; said structure comprising a first circular tier of substantially perpendicular alternating upright and inverted A units, wherein said equal sides E of said alternating upright and inverted A units abut and mate with each other along said equal side edge angles X of each unit thereof, and said outer planar surfaces of each of said alternating units cant inwardly and outwardly; an inwardly canted, second circular tier of alternating upright A units and inverted B units, wherein said third sides F of upright A units of said second tier abut and mate with said third sides F of said inverted A units of said first tier along said third side edge angles X of each unit thereof, and wherein said equal sides E of said upright A units abut and mate with said equal sides E of said inverted B units along said equal side edge angles X of each unit thereof; an inwardly canted third circular tier of alternating upright B units and inverted C units, wherein said third sides G of said upright B units abut and mate with said third sides G of said inverted B units of said second tier along said third side edge angles X of each unit thereof, and wherein said equal sides E of said upright B units abut and mate with said equal sides E of said inverted C units along said equal side edge angles X of each unit thereof; an inwardly canted fourth circular tier of upright D units which form a conical top for said structure and which abut and mate with said inverted C units of said third tier along said third side H and said third side edge angles Y of each unit thereof, and wherein said equal sides I of said upright D units abut and mate with adjacent equal sides I and equal side edge angles Z of each unit thereof;

said edge angle X and the number of said A units in said first circular tier are determined by the selected radius of the basic of said structure and the selected dimensional third side lengths F of the A units; said structure having a center height which is less than the radius of said first circular tier of structural A units, wherein said center height is determined by the selected dimensional equal side length E and the selected side edge angle Y; said edge angle Y being determinant of said inward cantation of said fourth tier of D units, whereby said edge angle Y is selected to obtain a desired inward cant which produces a center height which is less than the radius of said first circular tier of structural A units.

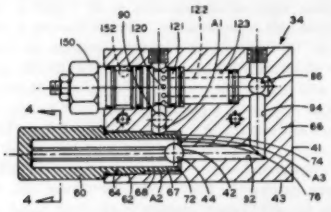
---

**4,146,998**

## POSITION RESPONSIVE VALVE FOR CONTROLLING THE RETRACTION RATE OF A LOWER BOOM IN AN ARTICULATED BOOM ASSEMBLY

**Leonard L. Johnson, Fort Wayne, Ind., assignor to TECO, Inc., Fort Wayne, Ind.**

**Filed Feb. 16, 1977, Ser. No. 769,120**
**Int. Cl.[2] E04H *12/34***
**U.S. Cl. 52—115** **6 Claims**




1. In an upper and lower boom mobile lift platform system, a combination of fluid motor actuators adapted to effect angular movement of said upper boom and lower booms respectively, and control means associated with the fluid motor actuator for said lower boom and effective for controling its angular downward movement into retracted position and consisting of a regulating means effective as the lower boom approaches its terminal downward movement into retracted position to develop a predetermined reduced pressure and accompanying fluid flow, a first valve means including a hydraulic line for controlling fluid pressure to the lift piston of said fluid motor actuator associated with the lower boom to effect its angular movement in a raising direction, a second valve means adapted to communicate fluid pressure to the lift piston in said fluid motor actuator and thereby effecting actuation of said lower boom in a lowering direction, and gravity responsive means for making effective or ineffective said regulating means responsively to the angular position of said lower boom whereby said lower boom in predetermined critical angular positions approaching horizontal position effects a throttling action to reduce pressure communicable to the piston of said hydraulic actuator association with said lower boom to effect a diminished rate of lowering movement of said lower boom in the terminal angular increment just preceding movement of the lower boom into its full retracted position.

---

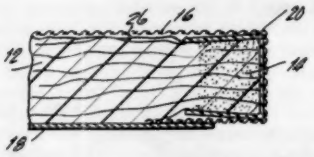
**4,146,999**

## ACOUSTICAL PANEL WITH RIGIDIFIED EDGES

**David C. Petrovec, 2154 Wantagh Park Dr., Wantagh, N.Y. 11793, and Philip M. Petrovec, 2 Stewart Ct., Baldwin, N.Y. 11510**

**Filed Jun. 10, 1977, Ser. No. 805,288**
**Int. Cl.[2] E04B *1/82***
**U.S. Cl. 52—145** **4 Claims**

1. An acoustical panel comprising a core of sound attenuating material having a front major surface and a back major surface, said core having edges rigidified by a hardenable impregnant imbibed therein to form a strip of rigid material along the periphery of said core; a fabric coating (stretched over said front major surface and) substantially coextensive with the said entire front surface; (said fabric extending beyond said edges); high-impact resistant channels secured to said edges and connected together at their corners to form a reinforcing frame for said panel; said fabric being stretched over said channels members thereby forming a sound attenuating air gap between the inner surface and the front major surface of said core within said panel; and a board member disposed upon and covering the ends of said fabric and back major surface of the core.



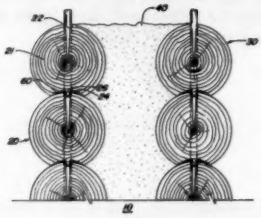

---

**4,147,000**

## INSULATED LOG BUILDING STRUCTURE

**Robert E. Lewandowski, c/o Mayfield Stage, Boise, Id. 83707**

**Filed Oct. 31, 1977, Ser. No. 846,728**
**Int. Cl.[2] E04B *1/10***
**U.S. Cl. 52—233** **5 Claims**




1. An insulative log building structure comprising:

a plurality of horizontally extending cylindrical logs of substantially uniform diameter mounted vertically upon one another forming a first wall;

a plurality of horizontally extending cylindrical logs of substantially uniform diameter mounted vertically upon one another forming a second wall, each of said logs forming said walls including an upper portion, convexly curved in cross section and provided with a longitudinally extending groove and a lower portion having a longitudinally concavely curved groove and having a longitudinally extending tongue outwardly extending from substantially the center of said groove, said groove of the upper portion of each log mateably receiving the tongue of an overlying log;

a layer of insulating material contained between said first and second walls, said material having a lower thermal conductivity than the walls;

at least one tie rod, vertically extending through centrally aligned apertures of each log of each wall from the lowermost log to the uppermost log of each wall; and

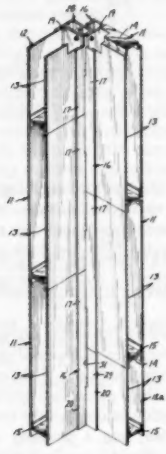
tie rod holding means for holding tie rods of each wall in a vertically aligned relationship with one another.

4,147,001

## CONNECTOR FOR WALL PANEL STRUCTURE

Wayne H. Oliver, 1305 Spring Valley Rd. North, Minneapolis, Minn. 55422

Filed Nov. 7, 1977, Ser. No. 849,104
Int. Cl.[2] E04B 1/08; E04C 1/10
U.S. Cl. 52—284 2 Claims



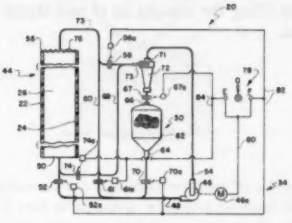
1. In combination, a plurality of generally rectangular wall panels each having spaced parallel side wall surfaces, opposed top and bottom surfaces, opposite vertically extended ends, and self locking connector elements at said opposite ends; each of said connector elements extending substantially the full vertical length of its respective panel and comprising laterally spaced generally flat side wall portions, an outer generally flat transverse wall portion connecting said side wall portions, and a partition substantially coextensive in length with said side wall portions and connecting said side wall portions in inwardly spaced parallel relationship to said outer transverse wall portion; said side wall portions projecting outwardly from the panel ends in planes parallel to the planes of said panel side wall surfaces and rigidly connected to the panel side wall surfaces; said side wall portions, transverse wall portion and partition of each connector element cooperating to define an open ended passageway and having opposite ends adjacent respective ones of said top and bottom surfaces of the panel; said transverse wall portion and at least one of said side wall portions of each connector element each having a pair of aligned longitudinal slots extending from opposite ends of their respective connector element longitudinally of the passageway defined thereby; each slot having a bottom disposed in spaced relationship to the bottom of the slot aligned therewith; slots of the transverse wall portion and one side wall portion of each connector element being arranged to receive the transverse wall portion and one of the side wall portions of another connector element beyond the bottom of the slots thereof when said panels are moved into interlocking relationship at generally right angles to each other; the slots in said side wall portions of each connector element being disposed along one side of their respective partition and having one side in substantially coplanar relationship with one side of its respective partition.

4,147,002

## LIGHT VALVE SYSTEM AND GREENHOUSE UTILIZING THE SAME

Glenn E. Kautz, Sewickley, Pa., assignor to H. H. Robertson Company, Pittsburgh, Pa.

Filed Feb. 14, 1977, Ser. No. 768,543
Int. Cl.[2] E04C 1/42
U.S. Cl. 52—306 18 Claims



1. A light valve comprising:
spaced-apart sheets of light-transmitting material arranged to define a cavity;
a source of dry particulate material;
conveying means communicating with said cavity (a) for introducing dry particulate material from said source into said cavity to restrict light transmission through said cavity from one side to the other, and (b) for returning dry particulate material from said cavity to said source to restore light transmission through said cavity; and
means for obstructing discharge of dry particulate material from said cavity during introduction thereof.

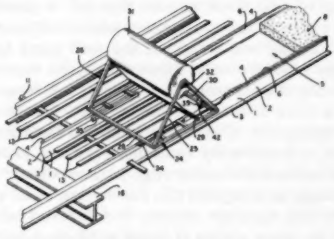
---

4,147,003

## INSULATED ROOF

Robert J. Alderman, Bradenton, Fla., assignor to Butler Manufacturing Company, Kansas City, Mo.

Continuation-in-part of Ser. No. 638,329, Dec. 8, 1975, Pat. No. 4,047,345, which is a continuation-in-part of Ser. No. 494,097, Aug. 2, 1974, Pat. No. 3,969,863, which is a continuation-in-part of Ser. No. 656,642, Feb. 9, 1976, Pat. No. 4,047,346, and Ser. No. 649,911, Jan. 16, 1976, Pat. No. 4,075,807. This application Sep. 12, 1977, Ser. No. 832,656
Int. Cl.[2] E04B 2/28, 2/60; E04F 21/00
U.S. Cl. 52—309.8 12 Claims



1. A roof structure comprising a plurality of rafters and the like oriented in spaced approximately parallel relationship with respect to one another, a plurality of purlins supported by said rafters in spaced approximately parallel relationship with respect to one another and extending across said rafters, each of said purlins including an upper laterally extending flange, a central web and a lower laterally extending flange, sheets of hard roofing material and the like supported by the upper laterally extending flanges of said purlins, fasteners connecting said sheets of hard roofing material to the upper laterally extending flanges of said purlins, elongated strips of flexible

sheet material extending along the lengths of the spaces between said purlins and spanning the spaces between adjacent ones of the purlins, the outer edges of said strips of flexible sheet material resting on the top surfaces of the upper laterally extending flanges of adjacent ones of said purlins with the portions of said strips between said purlins extending down to a lower level into the space between the central webs of said purlins and forming troughs between said purlins, insulation material positioned in the troughs of said sheet material and substantially filling the troughs up to said sheets of hard roofing material.

---

**4,147,004**

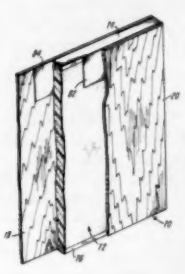
## COMPOSITE WALL PANEL ASSEMBLY AND METHOD OF PRODUCTION

**Stephen W. Day, 73 W. Alexandersville-Bellbrook Rd., Dayton, Ohio 45459, and Daniel M. Hutcheson, 3855 Upper Bellbrook Rd., Bellbrook, Ohio 45305**

**Continuation-in-part of Ser. No. 673,383, Apr. 5, 1976, Pat. No. 4,068,434. This application Sep. 26, 1977, Ser. No. 836,319**

**Int. Cl.[2] E04C *1/00***

**U.S. Cl. 52—309.9** **11 Claims**



1. A composite vertical wall panel assembly adapted to simplify the construction of a building structure, comprising an inner vertical facing of rigid sheet material and an outer vertical facing of rigid sheet material disposed in parallel spaced relation, each said facing extending substantially continuously between the top and bottom of the wall panel assembly, a preformed vertical core of substantially rigid foam insulation material disposed between and contacting said inner and outer facings, a layer of adhesive bonding each said facing to the corresponding side of said core to form a laminated vertical wall unit, a horizontally extending rigid top plate member disposed between the upper edge portions of said inner and outer facings, an elongated thin flat vertical metal sheet separate from said top plate member and disposed between said core and the upper portion of one of said facings and extending horizontally along the upper portion of said wall unit, said vertical metal sheet projecting downwardly from said top plate member and having a vertical height substantially greater than the thickness of said wall unit, said foam core having a substantially uniform thickness between the top and bottom of said wall unit, and layers of adhesive bonding said metal sheet to said core and to said one facing causing said metal sheet to form a horizontally extending header beam within the upper portion of said wall unit for substantially increasing the load bearing strength of the wall unit above a doorway or window opening formed within the wall unit.

**4,147,005**

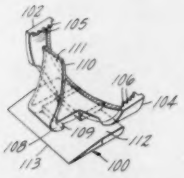
## MOLDING CLIP AND METHOD OF ASSEMBLY

**Engelbert A. Meyer, Sun City, Calif., assignor to USM Corporation, Farmington, Conn.**

**Continuation-in-part of Ser. No. 739,844, Nov. 9, 1976, which is a continuation-in-part of Ser. No. 694,078, Jun. 9, 1976. This application Apr. 6, 1977, Ser. No. 784,454**

**Int. Cl.[2] E04F *19/02***

**U.S. Cl. 52—397** **6 Claims**




1. A fastener or adapter for attaching a flanged molding member or the like to a panel surface, wherein the molding bridges the gap between the panel and a structural member spaced therefrom, having front and back surfaces substantially comprising:

a body portion having a bottom surface contacting said panel surface;

a resilient tab extending forwardly outwardly from the body portion and having means disposed on the bottom surface thereof for engaging a flange of the molding member;

a pair of resilient wings extending upwardly from the sides of said body portion to contact the bottom surface of said structural member, and a plurality of locking elements formed on each of said wings and extending from each of said wings for projecting upwardly adjacent the back surface of said structural member with said fastener located at a plurality of positions relative to the front and back surface of the structural member for resisting forward movement of said fastener, whereby said fastener or adapter is retained between said panel surface and said structural member with said wings in the flexed state contacting said structural member.

---

**4,147,006**

## WINDOWS

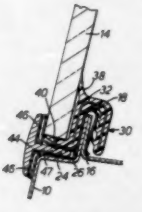
**Werner Kruschwitz, Viersen, Fed. Rep. of Germany, assignor to Draftex Development AG, Switzerland**

**Filed Jan. 6, 1978, Ser. No. 867,218**

**Claims priority, application United Kingdom, Jan. 19, 1977, 2192/77**

**Int. Cl.[2] B60J *1/02*; E04C *2/38***

**U.S. Cl. 52—401** **10 Claims**




1. A sealing and retaining arrangement for sealing and retaining a window glass in a window opening having a flange running therearound, comprising

channel-shaped resilient metal support means embracing the flange,

projection means integral with the support means and projecting outwardly of the window opening at least at inter-

vals along the length of the flange, the projection means carrying locking means,

a flexible channel-shaped strip structure comprising flexible material and sized in length to match the length of the periphery of the window opening and sized in cross-section to embrace the flange and the channel-shaped part of the said support means but not the projection means of the support means,

a sealing part on the outside surface of the strip structure and positioned thereon to extend along the complete length of the flange and to be directed outwardly of the opening, and shaped to define a seat for receiving the peripheral edge of the window glass and the surface thereof on the inside of the window opening,

a window glass in the opening and seated in and on the said seat of the sealing part of the strip structure, and

a retaining member sized to extend around the said opening, the retaining member defining a first part which contacts the outside surface of the window glass in position on the opening, and a second part mechanically locking with the locking means on the projection means so as positively to hold the retaining member in position and thereby to hold the window glass in position.

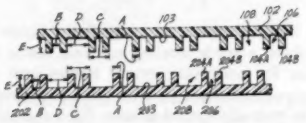
---

**4,147,007**

## MATABLE MODULAR ELEMENTS FOR TOY, DISPLAY AND MODEL APPLICATIONS UTILIZING PAIRED RIB STRUCTURE

**Helmut Eppich, West Vancouver, Canada, assignor to Ebco Industries, Ltd., Richmond, Canada**

**Filed Dec. 10, 1976, Ser. No. 749,345**
**Int. Cl.[2] E04B *2/08*; G09B *25/04***
**U.S. Cl. 52—570** **48 Claims**




1. A matable modular element for use in constructing toys, graphic displays, and structural models, said matable modular element comprising a base having a base surface, and a plurality of parallel rib pairs protruding from and coterminous with said base surface, each said rib pair including first and second, parallel ribs which extend longitudinally and continually along said base surface and which are transversely spaced from each other to define a first groove therebetween, with said plurality of rib pairs also being transversely spaced from each other and adjoining ones of said plurality of rib pairs defining therebetween a second groove, and wherein each said first and each said second rib has a width A in a direction transverse to the longitudinal extension thereof, wherein each said first groove has a transverse width B, where B is substantially equal to $n$A, wherein $n$ equals 1, 2, 3, . . . , wherein each said rib pair has a transverse width C, where C is substantially equal to $(2+n)$A, and wherein each said second groove has a transverse width D, where D substantially equal to C.

---

**4,147,008**

## RESILIENT REINFORCEMENT SPACER

**Horst Eisner, Sauerbruchstrasse 4, Nuremberg, Fed. Rep. of Germany**

**Filed Jul. 11, 1977, Ser. No. 814,810**
**Int. Cl.[2] E04C *5/20***
**U.S. Cl. 52—684** **10 Claims**

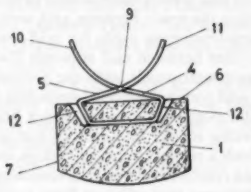
1. A spacer for attachment to a reinforcing element for reinforced concrete comprising

a moulded member,

a stirrup of resilient wire having

a base portion embedded in said moulded member,

and two protruding wire ends extending from the upper surface of the moulded member in the direction of each other with an acute angle between said protruding ends and said surface, with said wire ends intersecting each other above said surface and spaced for clamping the reinforcing element between the protruding ends and




the surface of the moulded member by placing the free ends of said protruding wire end beyond the intersection point astraddle of the reinforcing element and forcing the spacer down to it while turning the spacer substantially 180° about an axis through the point of intersection of said protruding wire ends.

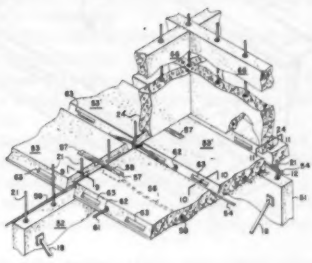
---

**4,147,009**

## PRECAST PANEL BUILDING CONSTRUCTION

**C. Nicholas Watry, 955 Cambridge Rd., Redwood City, Calif. 94061**

**Continuation-in-part of Ser. No. 637,580, Dec. 4, 1975, abandoned. This application Mar. 3, 1977, Ser. No. 773,853**
**Int. Cl.[2] E04B *5/19***
**U.S. Cl. 52—744** **7 Claims**



1. In a method of forming a concrete building, the steps of erecting a pair of load bearing wall panels generally parallel to and spaced apart from one another; supporting at least two floor panels for a floor construction horizontally adjacent one another on said walls spanning the space therebetween placing a post-tensioning cable for said floor construction along the joint between said adjacent floor panels transverse to said load bearing walls with the portions of said cable over said walls positioned vertically above a portion of said cable positioned over the space between said walls; filling the joint between said adjacent floor panels with mortar; and post-tensioning said cable after said mortar is set.

4. In a method of forming a concrete building, the steps of:

forming a horizontal base structure with a plurality of spaced apart dowels projecting thereabove along a pair of proposed joints between said structure and a pair of proposed load bearing walls, which joints are generally parallel and spaced apart from one another;

providing a pair of preformed wall panels having voids extending vertically therethrough at a spacing from one another generally the same as the spacing between said dowels at said proposed joints;

placing each of said wall panels respectively along an associ-

ated one of said proposed joints with the base structure dowels at said associated joint projecting into an associated wall void;

inserting a reinforcing bar into each of a plurality of said wall voids having a dowel projecting thereinto to a location at which said bar overlaps said dowel;

supporting at least two floor panels for a floor construction on said two wall panels horizontally adjacent one another and spanning the space between said wall panels;

placing a post-tensioning cable for said floor construction along the joint between said adjacent floor panels transverse to said wall panels with the portions of said cable over said wall panels positioned vertically above a portion of said cable positioned over the space between said wall panels; forcing mortar into each of said wall panel voids within which a reinforcing bar overlaps said dowels to tie each of said reinforcing bars to its associated dowel; filling the joint between said adjacent floor panels with mortar; and post-tensioning said cable in said joint after said mortar in said joint is set.

---

**4,147,010**

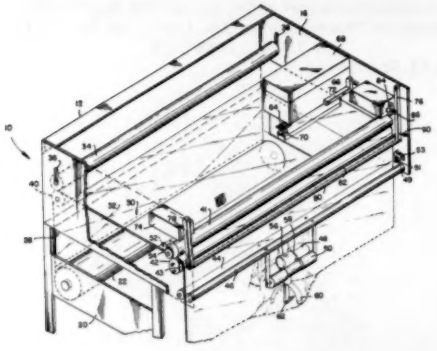
## PHOTOELECTRICALLY CONTROLLED GARMENT BAGGER

**Sherman Firsty, Dobbs Ferry, N.Y., assignor to Gloran Plastic, Inc., Dobbs Ferry, N.Y.**

**Filed Jan. 3, 1978, Ser. No. 866,249**

**Int. Cl.[2] B65B** *57/02, 25/20*

**U.S. Cl. 53—64** **6 Claims**



1. A photoelectrically controlled garment bagger, comprising a support frame, a housing mounted on said frame and having a rear wall and a pair of side walls, a roll of translucent polyethelene sequentially detachable bags mounted in said frame, said roll being provided with transverse perforations along which the bags may be detached from one another, said bags each being provided with an opaque spot a predetermined distance from said perforations, said bags further having leading edges forming an opening portion and following edges forming a substantially heat sealed portion, a roller assembly in said housing for travel of said roll of bags, a clamp bar in said housing for braking the travel of said bags, photoelectric light responsive control means positioned in said housing above the path of travel of said bags, means in said housing for operating said clamp bar, said operating means being energized and deenergized from a current source through said control means when an opaque spot on each of said bags arrives in a predetermined position with relation to said light sensitive control means, a spreading device for spreading the leading portions of said bags mounted on the housing, for pulling the bags over garments

said roller assembly comprising a first movable roller, a first fixed roller, a second movable roller, a second fixed position roller provided with a flat, a first pair of output rollers, all said rollers being mounted between said housing's sides, a second pair of output rollers spacedly mounted on one of said first pair of output rollers and a pawl and ratchet mechanism on one of said sides for preventing said second movable roller from reversing its travel direction opposite the travel of said bags.

---

**4,147,011**

## BOTTLE TREATING APPARATUS

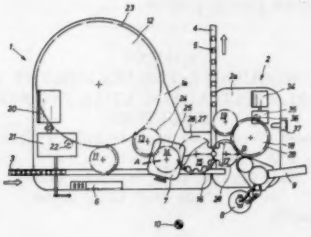
**Hermann Kronseder, Regensburger Str., 8404 Wörth, Donau, Fed. Rep. of Germany, and Karl Dullinger, Neutraubling, Fed. Rep. of Germany, assignors to Hermann Kronseder, Wörth, Fed. Rep. of Germany**

**Filed Jul. 25, 1975, Ser. No. 599,309**

**Claims priority, application Fed. Rep. of Germany, Jul. 30, 1974, 2436591; Oct. 29, 1974, 2451310**

**Int. Cl.[2] B65C** *3/14*

**U.S. Cl. 53—137** **2 Claims**



1. Bottle treating apparatus comprising a bottle filling and closing machine, a bottle labeling machine, bottle infeed conveyor means for conveying empty bottles into said bottle filling and closing machine, positive pitch conveyor means for conveying in mutually spaced relation filled and closed bottles from said bottle filling and closing machine to said bottle labeling machine, a bottle outfeed conveyor means for conveying filled, closed, and labeled bottles away from said labeling machine, said bottle infeed conveyor means, said positive pitch conveyor means and said bottle outfeed conveyor means together forming a conveyor path on which said bottles travel through the apparatus, said bottle filling and closing machine and bottle labeling machine being located on opposite sides of said conveyor path and being mounted close enough to each other that both machines can be operated by a single operator, drive means for said labeling machine and a releasable clutch in said drive means for said labeling machine to permit said filling and closing machine to be driven independently of said labeling machine.

---

**4,147,012**

## METHOD AND APPARATUS FOR PACKING SLAUGHTERED BIRDS, INCLUDING POULTRY, INTO AN ENVELOPE, ESPECIALLY A BAG SHAPED PACKAGE

**Martinus P. G. van Mil, Boxmeer, Netherlands, assignor to Stork PMT B.V., Boxmeer, Netherlands**

**Filed Mar. 3, 1978, Ser. No. 882,981**

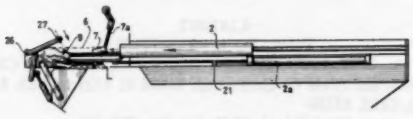
**Claims priority, application Netherlands, Mar. 10, 1977, 7702628**

**Int. Cl.[2] B65B** *43/26*

**U.S. Cl. 53—468** **16 Claims**

1. A method of mechanically packing a slaughtered bird, which method comprises, opening an inlet of an envelope resting on a support, pushing a bird resting with stretched legs

on a support into the envelope by exercising a force on the body of the bird, then pressing the legs upwardly to locate the



legs in a folded position on both sides of the body and thereafter sealing the envelope.

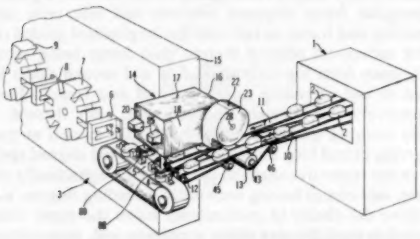
---

**4,147,013**

## DEVICE FOR TRANSFERRING SOFT CAKE-SHAPED PRODUCTS FROM A FIRST TO A SECOND CONVEYOR

**Enzo Seragnoli, Bologna, Italy, assignor to G.D. Societa per Azioni, Bologna, Italy**

**Filed Apr. 26, 1978, Ser. No. 900,116**
**Claims priority, application Italy, Jul. 6, 1977, 3495 A/77**
**Int. Cl.[2] B65B *57/14, 57/16***
**U.S. Cl. 53—494** **7 Claims**



1. An improved transfer device to be used in a plant substantially comprising at least one soft cake-shaped product manufacturing machine and a wrapping machine for successively wrapping said cake-shaped products, a first unidirectionally continuously moved delivery conveyor of the manufacturing machine, a second unidirectionally stepwise moved feeding conveyor of the wrapping machine, and means for regulating the speed of said wrapping machine for balancing the output thereof with the output of the manufacturing machine, said device comprising:

sucker means for transferring the cake shaped products from a drawing area near the tailing portion of said first conveyor to a delivery area near the leading portion of said second conveyor;

intercepting bar means positioned at the end of said first conveyor near said drawing area;

sensor means positioned adjacent said drawing area for sensing the regular sequence of products on said first conveyor;

suction and compression means for cyclically connecting said sucker means alternatively to a suction and compressed air source;

a sliding member reciprocatingly sliding along at least a stationary and horizontal guide means parallel to said first conveyor;

a vertical guide means secured to said sliding member for the vertical shifting of said sucker means;

a first kinematic motion for reciprocatingly sliding said sliding member along said horizontal guide means;

a second kinematic motion for reciprocatingly shifting said sucker means along said vertical guide means;

a locking device for locking said vertical reciprocating shifting of the sucker means on its upwardly directed position when said sensor means detects an irregular sequence of products on said first conveyor; and

a third kinematic motion for cyclically shifting said intercepting bar means from a first substantially vertical intercepting position for intercepting the products on said first conveyor to a second inclined disengaged position and viceversa.

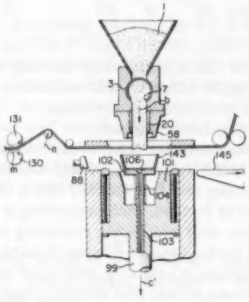
---

**4,147,014**

## APPARATUS FOR AUTOMATICALLY MANUFACTURING CUPPED FOOD MATERIALS

**Yasunori Tashiro; Takahiro Yashiro, and Katsuaki Higuchi, all of Utsunomiya, Japan, assignors to Rheon Automatic Machinery Co., Ltd., Japan**

**Continuation of Ser. No. 672,794, Apr. 1, 1976, abandoned. This application Jan. 10, 1978, Ser. No. 868,457**
**Claims priority, application Japan, Apr. 3, 1975, 50-10954; Aug. 27, 1975, 50-103758**
**Int. Cl.[2] B65B *43/08, 47/04***
**U.S. Cl. 53—559** **8 Claims**



1. An apparatus for automatically manufacturing cupped food materials, comprising:

means for intermittently advancing a strip of sheet material along a predetermined path;

means at least partially situated along said path for cutting out at a predetermined location therealong a blank from said strip;

means at least partially situated along said path for moulding at said predetermined location a cup from said blank, said cup moulding means comprising

a male mould member fixedly secured above said path,

a female mould member normally positioned beneath said path,

a hollow tube passing axially and substantially centrally through said female mould member, said tube being slidable relative to said female mould member,

a bottom mould portion adapted to pass vertically within said female mould member and connected with said tube, said bottom mould portion having an opening therein communicating with the interior of said hollow tube,

means operatively associated with said hollow tube for reducing the air pressure therein when commencing the moulding of said cup, and

means operatively associated with said female mould member for moving it and said bottom mould portion upwardly for moulding a

cup from said blank in cooperation with said male mould member;

a hopper situated along said path at said predetermined location;

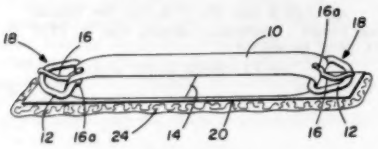
means operatively associated with said hopper for filling the moulded cup with food material fed through said hopper, said filling means including a passageway formed substantially axially of said male mould member so as to allow food material to pass therethrough from said hopper; and

means at least partially situated along said path for moving

the cupped food material from said predetermined location.

---

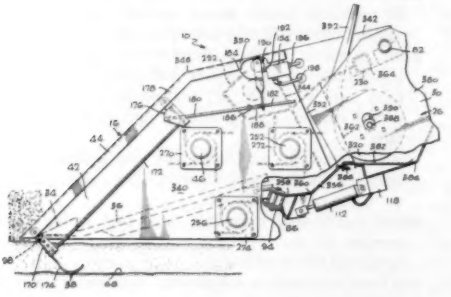
**4,147,015**
**SADDLE GIRTH**
Tom G. Land, P.O. Box 145, Cranfills Gap, Tex. 76637
Filed Mar. 7, 1977, Ser. No. 775,171
Int. Cl.[2] B68C *1/14*
U.S. Cl. 54—23 6 Claims




1. A saddle girth which passes under the belly of a horse and is connected to saddle billets to hold a saddle in place on the horse's back, the combination comprising:
(a) a first elongate fabric member,
(b) a second fabric member sewn to each of the end regions of said first member, the ends of said first member butted together forming said first member into a closed loop,
(c) a pair of cinch buckles, each comprising a D-ring and a buckle tongue, each said D-ring encircling said first member and said buckle tongues passing through holes formed at opposite points on said loop, said cinch buckles held in place by sections of said first member joined together on each side of said holes and
(d) a fleece pad sewn to an outer surface of said second fabric member and extending beyond the sides of said loop and beyond each said cinch buckle for uniformly distributing the tension of said girth on the horse and for protecting the horse from irritation by said cinch buckles.

---

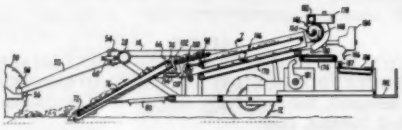
**4,147,016**
**HARVESTER HAVING HEIGHT ADJUSTABLE HEAD**
James K. Jensen, Ankeny, and Joe H. Hoeksema, Des Moines, both of Iowa, assignors to Deere & Company, Moline, Ill.
Filed Jan. 13, 1977, Ser. No. 758,909
Int. Cl.[2] A01D *45/18*
U.S. Cl. 56—15.8 25 Claims



1. A crop treating vehicle having a movable frame, a crop treating head, the head having crop treating means adjacent a front end thereof and being adjustably mounted on the frame at a rear end thereof opposite the front end to position the head at a selected basic height, said head being of integral, non-pivotable construction along the length thereof between the front and rear ends thereof, said vehicle including means for twisting the head along the length thereof between the front and rear ends thereof to change the angle of the front end relative to the rear end and thereby vary the relative heights of the opposite sides of the front end of the head.

---

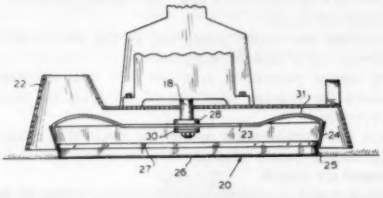
**4,147,017**
**TOMATO HARVESTER**
Dean A. Cortopassi, 11292 N. Alpine Rd., Stockton, Calif. 95205, and Alvin G. Cortopassi, 14993 E. Highway 26, Linden, Calif. 95236
Filed Feb. 3, 1977, Ser. No. 765,206
Int. Cl.[2] A01D *45/00*
U.S. Cl. 56—16.5 3 Claims



1. An improved shaker conveyor for a tomato harvesting apparatus, said conveyor comprising: a pair of side rails mounted on the apparatus and extending longitudinally thereof in transversely spaced relationship to one another; a generally rectangular frame disposed between said side rails; means mounting said frame on said rails for longitudinal guided rectilinear movement relative thereto, said frame being substantially open from top to bottom; first and second shafts journaled to and extending transversely of said frame adjacent, respectively, the forward and rearward ends thereof; said shafts carrying sprockets along the lengths thereof at spaced intervals; closed loop chains extending around aligned sprockets on the respective shafts so as to extend longitudinally of the frame, said chains having outwardly extending fingers; means to drive the chains to continuously move the upper reaches thereof toward the rear of the apparatus; and, means to oscillate the frame back and forth in a rectilinear path on the side rails independently of and simultaneously with movement of the chains by the drive means therefor.

---

**4,147,018**
**ROTARY MOWER AND BLADE APPARATUS**
Joseph M. Valdespino, Orlando, Fla., assignor to Grassaw, Inc., Kansas City, Mo.
Filed Dec. 8, 1976, Ser. No. 748,514
Int. Cl.[2] A01D *55/18*
U.S. Cl. 56—295 16 Claims




12. A safety blade, for a rotary mower, or the like, comprising in combination:
a circular band;
support members connected to and supporting said band, said support members extending generally perpendicular to said band;
connecting means for connecting said support members to a lawn mower, or the like;
an annular blade attached to said circular band, and supported thereby, said annular blade having a plurality of cutting teeth formed in one edge thereof whereby said safety blade has an annular blade with vertically extending cutting teeth; and

said annular blade being attached with spacers to be spaced inside said circular band to form an inner annular cutting blade and an outer safety band.

---

**4,147,019**

## METHOD AND APPARATUS FOR PRODUCING A DRAFTABLE TWISTED ROVING

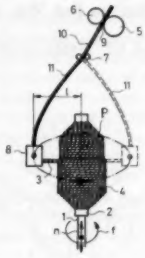
**Peter Novak, Winterthur, Switzerland, assignor to Rieter Machine Works, Ltd., Winterthur, Switzerland**

**Filed Jul. 13, 1978, Ser. No. 924,288**

**Claims priority, application Switzerland, Jul. 18, 1977, 8847/77**

**Int. Cl.[2] D01H** *1/00, 7/02, 7/92*

**U.S. Cl. 57—66** **22 Claims**



1. A method of producing a twisted draftable roving comprising the steps of

supplying a continuous strand of parallel substantially twist free fibers from a delivery point of a rotating bobbin at a winding station at a predetermined speed;

forming the supplied strand into a freely rotating balloon about the bobbin between said delivery point and said winding station to impart a permanent twist in the strand therebetween;

superimposing a false twist in the strand between said delivery point and a second point upstream of said winding station to increase the twist in the strand between said points; and

thereafter eliminating said false twist in the strand between said second point and said winding station prior to winding of the strand onto the bobbin at said winding station wherein the distance between said second point and said winding station is smaller than the length at which the roving still containing the permanent twist slides apart under tension, whereby a twisted draftable roving is formed into a package on the bobbin.

7. An apparatus for producing a twisted draftable roving comprising

a fiber supply device for continuously supplying a strand of parallel substantially twist-free fibers in the form of a small sliver;

a rotating spindle for mounting of a bobbin tube thereon to receive the supplied strand thereon to form a roving package while forming the supplied strand in a rotating balloon coaxially of said spindle between said supply device and said spindle; and

a false twist device between said supply device and said spindle in the zone of said balloon for passage of the strand therethrough, said false twist device being rotatable about said spindle to impart a false twist in the supplied strand between said devices.

**4,147,020**

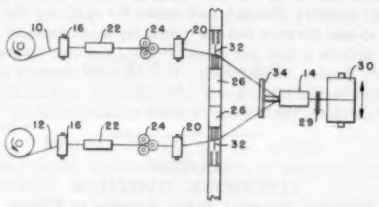
## COMMINGLING AIR JET DEFLECTOR

**Ralph C. Oakes, Toccoa, Ga., assignor to Milliken Research Corporation, Spartanburg, S.C.**

**Filed Jun. 16, 1978, Ser. No. 916,121**

**Int. Cl.[2] D02G** *1/16;* **D01H** *7/90*

**U.S. Cl. 57—289** **5 Claims**



1. In a yarn processing machine having a means to friction false twist a plurality of multifilament, synthetic yarns and an air jet entangling nozzle to entangle at least two of the friction false twisted yarns, the improvement comprising a yarn end break detector means mounted between said means to false twist yarns and said nozzle and an air deflector located between said yarn break detector means and said air nozzle to prevent air from said air nozzle from blowing yarn residue on said yarn break detector means.

---

**4,147,021**

## ELECTRONIC WATCH HAVING AN ALARM MEANS

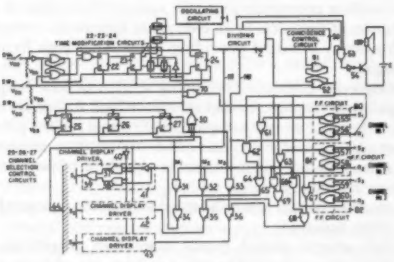
**Kenichi Kondo, Tokyo, Japan, assignor to Kabushiki Kaisha Daini Seikosha, Japan**

**Filed Oct. 21, 1976, Ser. No. 734,427**

**Claims priority, application Japan, Oct. 28, 1975, 50-129581**

**Int. Cl.[2] G04B** *23/00*

**U.S. Cl. 58—16 D** **1 Claim**



1. An electronic alarm watch, comprising: an oscillator circuit for generating an oscillating time standard signal; a dividing circuit connected to receive the oscillating time standard signal for dividing the same and for developing a repetitive timing signal having a repetition rate defining a unit of time; a counter circuit connected to receive the timing signal for counting the same and for developing a count representative of time; memory means having a plurality of channels for memorizing a plurality of alarm times; coincidence detecting means cooperative with said counter circuit and said memory means for detecting coincidence between the time represented by the count developed by said counter circuit and said plurality of alarm times and for developing a coincidence signal indicative of the detected coincidence; a plurality of displays each corresponding to a respective memory channel and each having a driving circuit for driving the associated display, wherein each of said display driving circuits includes a two-input NOR circuit for developing an output signal for driving the associated display, a pair of two-input AND circuits each having an output terminal connected to a respective input of

said NOR circuit, and an inverter connected to one input of one of said AND circuits; channel selecting means for selecting a respective memory channel for comparison with the contents of said counter circuit; means cooperative with said channel selecting means and said coincidence detecting means for applying the coincidence signal and the inverse of the coincidence signal each to an input of a respective one of said AND circuits in the one of said driving circuits corresponding to the selected memory channel; and means for applying the timing signal to said inverter and the remaining input terminal of said AND circuits in said one of said driving circuits, whereby the memory display corresponding to a selected memory channel will flash on and off at a rate determined by said timing signal when the alarm time of the selected memory channel occurs.

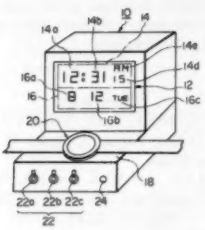
---

**4,147,022**

## ELECTRONIC TIMEPIECE

**Singo Ichikawa, Sayama, Japan, assignor to Citizen Watch Company Limited, Tokyo, Japan**

**Filed Sep. 22, 1976, Ser. No. 726,014**
**Claims priority, application Japan, Dec. 24, 1975, 50-154318**
**Int. Cl.[2] G04C *11/02***
**U.S. Cl. 58—35 W** **5 Claims**




1. A standard timepiece serving as a time correction device for providing correction pulses as standard time data to effect correction of time data in an electronic timepiece, comprising:

a frequency standard providing a relatively high frequency signal;

a frequency converter providing a train of low frequency pulses in response to said relatively high frequency signal;

a timekeeping circuit composed of first and second groups of counter means to provide standard time data composed of a plurality of time information signals in response to said low frequency pulses;

correction switch means adapted to provide a control pulse when actuated;

a digit selector switch means adapted to provide an input pulse when actuated to select at least one of digits indicative of said plurality of time information signals;

read-out circuit means including first memory counters connected at their first inputs in series with one another and connected at their second inputs in parallel with said first group of counter means to store the counts thereof, respectively, second memory counters connected at their first inputs in parallel to said second group of counter means, respectively, to store the counts thereof, respectively, and a plurality of coupling gate means for connecting selected one of said second memory counters in series to said first memory counters in response to said input pulse, said first memory counters comprising a seconds memory counter, a minutes memory counter, an hours memory counter and an AM/PM memory counter, said second memory counters comprising a dates memory counter, a days of week memory counter, and a months counter, said coupling gate means comprising a first AND gate connected between said AM/PM memory counter and said dates memory counter, a second AND gate connected between said dates memory counter and said days of week memory counter, and a third AND gate connected between said days of week memory counter and said months counter;

read-out control signal generator means responsive to said control pulse for generating sampling pulses, and first read-out control signals to shift the contents of said first memory counters, respectively, said read-out control signal generating means being also responsive to said input pulse for generating a second read-out control signal to shift the content of said selected one of said second memory counters;

read-out control gate means connected to an output of said read-out circuit means for reading out the contents shifted therein, in response to said sampling pulses; and

data transmitting means connected to an output of said read-out control gate means for transmitting said correction pulses to said electronic timepiece.

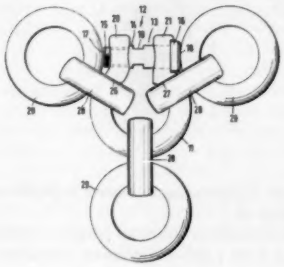
---

**4,147,023**

## CHAIN NET

**Erhard A. Weidler, Aalen-Unterkochen, Fed. Rep. of Germany**

**Filed Dec. 9, 1977, Ser. No. 859,164**
**Claims priority, application Fed. Rep. of Germany, Dec. 17, 1976, 2658009**
**Int. Cl.[2] F16G *15/00***
**U.S. Cl. 59—86** **11 Claims**




1. Chain net with at least one horizontally arranged chain lock and at least three vertical links hooked therein, which in turn are each connected with a further horizontal link, said chain lock being formed by an essentially C-shaped basic body with an entry slot for the vertical links and a locking element having a foot on one of its ends and a head on the other of its ends, said locking element bridging said entry slot of said C-shaped body characterized therein that in the locking position the locking element (**14, 30, 31, 34, 36**) and the basic body (**11**) form stops (**17, 26; 18, 27**), the position of the stops assigned to the connected vertical and horizontal links (**28, 29**), being coordinated in such a way with each other and with the dimensions of the vertical and horizontal links (**28, 29**) that the vertical links (**28**) cannot move into the area of the locking element.

---

**4,147,024**

## DUAL CYCLE GAS TURBINE ENGINE SYSTEM

**Heinz F. Moellmann, New Haven, Conn., assignor to Avco Corporation, Stratford, Conn.**

**Filed Sep. 15, 1977, Ser. No. 833,532**
**Int. Cl.[2] F02C *7/00, 7/08***
**U.S. Cl. 60—39.15** **8 Claims**

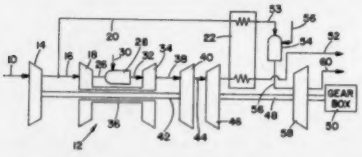
1. A dual cycle gas turbine engine system comprising:

a high pressure ratio turbine engine section having a two-spool compressor, a fueled high pressure combustor, a first high pressure turbine stage for driving the second compressor spool, a second high pressure turbine stage for driving the first compressor spool and a third high pressure turbine stage for powering a load via an axially centered output shaft, said high pressure ratio engine section

having an air intake at one end and an exhaust passage at its other end, said exhaust passage terminating at a first tailpipe;

a heat exchanger concentrically mounted in the exhaust passage of said high pressure ratio turbine engine section, said heat exchanger having first and second passage means, said first passage means serving to communicate spent products of combustion from the final turbine stage of said high pressure ratio turbine engine section to said first tailpipe; and

a moderate pressure ratio turbine engine section having a moderate pressure compressor, a fueled moderate pressure combustor and moderate pressure turbine stages and including an axially centered output shaft for powering a load, said moderate pressure ratio turbine engine section having an air intake at one end and a second tailpipe at its other end, said moderate pressure ratio turbine engine section including passages for ducting air from said moderate pressure compressor through said secondary passage means of said heat exchanger to said moderate pressure combustor whereby the heat energy to the moderate pressure ratio engine section is increased because of the heat energy absorbed from the spent products of combustion being exhausted from said high pressure ratio turbine engine section.




---

**4,147,025**

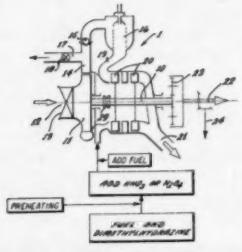
## FORMATION OF AUXILIARY DRIVE GAS FOR TURBINE

**Helmut Friedrich, Bremen, and Jürgen Schaper, Ganderkesee, both of Fed. Rep. of Germany, assignors to Vereinigte Flugtechnische Werke-Fokker GmbH, Bremen, Fed. Rep. of Germany**

**Continuation-in-part of Ser. No. 520,002, Nov. 1, 1974, abandoned. This application Mar. 14, 1977, Ser. No. 777,094**

**Int. Cl.[2] F02C *7/26, 7/32***

**U.S. Cl. 60—39.06** **7 Claims**




1. Method of operating a gas turbine by means of propellant gas generated under conditions in which regular combustion of aircraft fuel with air cannot be sustained, but by the following steps:

providing regular aircraft fuel;

reacting the aircraft fuel with an oxidizer other than oxygen of ambient air including igniting the oxidented fuel to obtain a propellant gas by exothermic reaction; and

adding aircraft fuel to the propellant gas prior to charging the gas turbine for operation thereof, the added fuel evaporating in the gas at least to a substantial extent fails to undergo combustion and being added for reducing the gas constant of said propellant gas.

---

**4,147,026**

## GAS TURBINE ENGINE

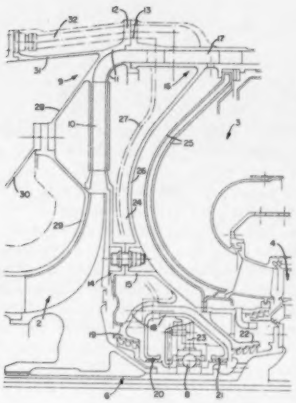
**Wolfgang Weiler, Dachau, Fed. Rep. of Germany, assignor to Motoren-und Turbinen-Union München GmbH, Fed. Rep. of Germany**

**Filed Sep. 22, 1977, Ser. No. 835,539**

**Claims priority, application Fed. Rep. of Germany, Sep. 22, 1976, 2642593**

**Int. Cl.[2] F02C *7/06***

**U.S. Cl. 60—39.08** **16 Claims**

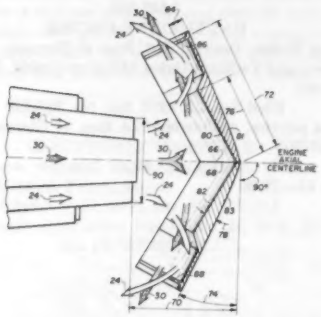


1. A gas turbine engine which includes a radial compressor means, a reversing annular combustion chamber means, a compressor drive turbine means, and a gas generator rotor means, characterized in that a fixed bearing means is disposed between the compressor means and the compressor drive turbine means for rotatably mounting the gas generator rotor means in the engine, a bearing spider having a box construction for resisting axial forces is provided for said fixed bearing means, a radial compressor diffuser means is operatively associated with said radial compressor means, the bearing spider means includes a first component and a second component, means are provided for connecting said first component to said second component, said first component includes a portion of the radial compressor diffuser means which is subjected to a radial flow and an elbow means for deflecting the radial flow so as to convert the same to an axial flow, said second component includes a portion of the radial compressor diffuser means which is subjected to an axial flow, said portion of the radial compressor diffuser means is connected to an end of said elbow means, said second component further includes a bearing box means for accomodating the fixed bearing means, a sealing means for sealing the bearing box means, and supply line means for suppling a lubricant to said bearing box means, and in that a portion of said second component is disposed between the section of the radial compressor diffuser means subjected to the axial flow and said bearing box means, said portion of said second component being formed as a conical shell which essentially follows a contour of a portion of a housing of the reversing annular combustion chamber means, said contour extending outwardly in a direction toward the radial compressor means.

## 4,147,027
## THRUST REVERSER NOZZLE

William K. Greathouse, East Northport, N.Y., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.

Continuation of Ser. No. 674,282, Apr. 6, 1976, abandoned. This application Jun. 28, 1977, Ser. No. 810,779
Int. Cl.[2] F02K 1/20, 3/04
U.S. Cl. 60—226 A 1 Claim

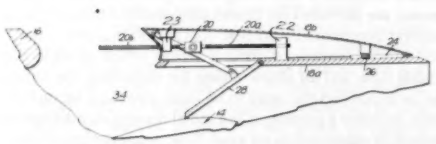



1. In combination with the tailpipes and shrouding structure of a turbofan engine having the exit planes of the annular fan air nozzle and core nozzle substantially near coincidence, a thrust reverser actuatable from a stowed position faired with the shrouding structure to a target position therebehind, said thrust reverser being characterized by the improvement of an interior surface in the stowed position having in great part a substantially cylindrical section extending aft of said fan air nozzle and core nozzle, said cylindrical section maintaining a cross-sectional flow area equal to or greater than the sum of the flow areas of said fan nozzle and core nozzle and the ratio of the diameter of said interior surface to the overall diameter of said fan nozzle is a value greater than one and less than or equal to 1.05.

## 4,147,028
## JET ENGINE THRUST REVERSER AND COWL STRUCTURE

Barry Rodgers, Mansfield, England, assignor to Rolls-Royce Limited, London, England

Filed Sep. 2, 1977, Ser. No. 830,351
Claims priority, application United Kingdom, Sep. 11, 1976, 37737/76
Int. Cl.[2] F02C 3/06; F02K 3/06, 1/20
U.S. Cl. 60—226 A 3 Claims

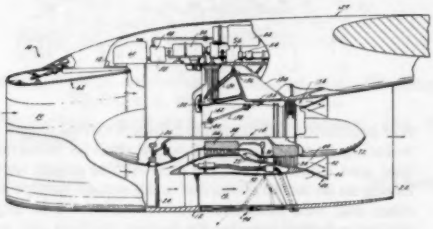


1. A jet engine thrust reverser including a cowl and a central body which together form an annular flow duct, said cowl having an upstream portion and a downstream portion translatable relative thereto in an axial direction of said annular flow duct, said downstream portion comprising an inner wall member and an outer wall member, means operatively connected to said outer wall member and to said inner wall member to cause simultaneous differential positional displacement of said outer wall member and said inner wall member relative to each other in said axial direction with said outer wall member being axially translated at a faster rate than axial translation of said inner wall member, a plurality of blocker flaps pivoted to and defining an upstream portion of said inner wall member, and links connecting said flaps to said outer wall member, said links reacting on said flaps when said differential positional displacement means translates said outer wall member at a faster rate than said inner wall member to thereby cause said flaps to pivot across said annular duct.

## 4,147,029
## LONG DUCT MIXED FLOW GAS TURBINE ENGINE

Donald F. Sargisson, Cincinnati, Ohio, assignor to General Electric Company, Lynn, Mass.

Division of Ser. No. 646,326, Jan. 2, 1976. This application Oct. 13, 1976, Ser. No. 731,664
Int. Cl.[2] F02K 3/06
U.S. Cl. 60—262 3 Claims



1. A gas turbine engine comprising:
a core engine including a compressor, combustor and high pressure turbine in serial flow relation;
a low pressure turbine disposed to receive the hot gases exhausted from the core engine;
an outer nacelle circumscribing and spaced apart from the core engine to define a bypass duct therebetween and extending upstream of the core engine to define an inlet to the gas turbine engine and downstream of the low pressure turbine to form the exhaust nozzle for the gas turbine engine;
a fan disposed in the inlet in driven engagement with the low pressure turbine for providing compressed airflow to the bypass duct and core engine;
means for suppressing engine noise;
means for mounting the engine to the pylon beam structure of an aircraft such that engine loads are balanced in a nonredundant manner;
said pylon beam mounting means comprising a forward trapezoidal bracket secured intermediate the pylon beam structure and the engine frame for absorbing vertical and said engine loads;
a pair of thrust links circumferentially spaced around the engine for absorbing engine thrust loads, each thrust link being secured at its upstream end to the engine frame by a fork having a uniball disposed therein and secured at the downstream end to the pylon beam structure; and
rear mount means secured to the engine frame and the pylon beam structure rearwardly of the thrust links for absorbing vertical, side and torque loads.

## 4,147,030
## ENGINE EXHAUST GAS PURIFICATION SYSTEM

Eturou Katahira; Shunzo Yamaguchi, both of Okazaki; Masashi Kida, Nishio, and Yasuhiko Ishida, Susono, all of Japan, assignors to Nippon Soken, Inc., Nishio and Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, both of, Japan

Filed Mar. 15, 1977, Ser. No. 777,651
Claims priority, application Japan, Apr. 19, 1976, 51/44652
Int. Cl.[2] F01N 3/10
U.S. Cl. 60—276 6 Claims

1. In an engine exhaust gas purification system of the type which comprises an exhaust gas reactor mounted on an exhaust pipe of an internal combustion engine, a secondary air supply

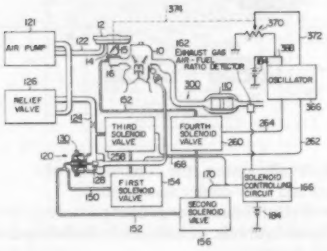
system including a secondary air supply passage connected to said engine exhaust pipe upstream of said reactor, and a detector disposed in the path of exhaust gas flow through said exhaust pipe downstream of the connection between said exhaust pipe and said secondary air supply passage to detect the air-fuel ratio of the exhaust gases to emit a corresponding output signal whereby the secondary air supply system is controlled to keep the engine exhaust gas air-fuel ratio substantially at an optimum value, wherein the improvement comprises:

a valve means including a valve member disposed in said secondary air supply passage for controlling the supply of secondary air into engine exhaust gases flowing through said exhaust pipe;

a valve actuator defining therein a pressure chamber and including a diaphragm bordering said chamber and operatively connected to said valve member;

a first pipeline for introducing a positive fluid pressure into said pressure chamber;

a second pipeline for introducing a vacuum pressure into said pressure chamber;




a first set of main and auxiliary solenoid valves disposed in said first pipeline in series relationship with each other to control the introduction of the positive pressure through said first pipeline into said pressure chamber;

a second set of main and auxiliary solenoid valves disposed in said second pipeline in series relationship with each other to control the introduction of the vacuum pressure through said second pipeline into said pressure chamber;

means associated with said exhaust gas air-fuel ratio detector and with said main solenoid valves of said first and second sets and being operative to compare the detector output signal with a reference signal thereby for controlling the operations of said main solenoid valves; and

an oscillator operative to periodically open and close said auxiliary solenoid valves of said first and second sets;

said valve actuator being controlled such that the secondary air is supplied to the engine exhaust gases at a continuously controlled, variable rate.

---

**4,147,031**

## INTERNAL COMBUSTION ENGINE WITH EXHAUST GAS RECIRCULATION SYSTEM

**Takeshi Tanuma, and Masanori Harada, both of Yokohama, Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan**

**Filed May 4, 1977, Ser. No. 793,500**

**Claims priority, application Japan, May 11, 1976, 51/58448**

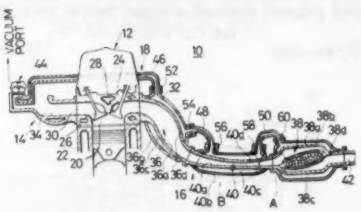
**Int. Cl.[2] F02M *25/06*; F01N *3/15***

**U.S. Cl. 60—278** **9 Claims**

1. An internal combustion engine system having an engine proper and an intake manifold fluidly connected to said engine proper to convey an air-fuel mixture fed into the same, said engine system comprising:

a first exhaust conduit section including a first inner shell member defining therein a first exhaust gas passage through which the exhaust gases from the engine proper are passed, and a first outer shell member substantially covering said first inner shell member to define between said first inner and outer shell members a first insulating space, said first inner shell member being formed with at least one opening to provide a fluid communication between said first exhaust gas passage and said first insulating space;

a second exhaust conduit section including a second inner shell member defining therein a second exhaust gas passage through which the exhaust gases from said first exhaust gas passage of said first exhaust conduit section are passed before discharged into the open air, and a second outer shell member substantially covering said second




inner shell member to define between said second inner and outer shell members a second insulating space, said second inner shell member being formed with at least one opening to provide a fluid communication between said second exhaust gas passage and said second insulating space;

first conduit means for providing a fluid communication between said first insulating space and the interior of said intake manifold; and

second conduit means for providing a fluid communication between said first and second insulating spaces.

---

**4,147,032**

## SECONDARY AIR SUPPLY CONTROL SYSTEM

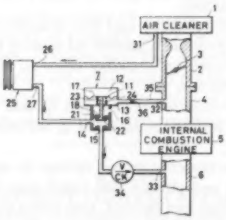
**Michio Suzuki, Hekinan, and Ken Shiozawa, Toyota, both of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan**

**Filed May 23, 1977, Ser. No. 799,267**

**Claims priority, application Japan, Dec. 21, 1976, 51/170302[U]**

**Int. Cl.[2] F01N *3/10***

**U.S. Cl. 60—290** **6 Claims**




1. A secondary air supply control system for use in an internal combustion engine, comprising:

an intake manifold;

an exhaust manifold;

an air pumping means;

a valve having a first chamber and a second chamber, which are separated by a diaphragm and communicated with each other through a first orifice provided in said diaphragm, means interconnecting said valve to the air pumping means and the exhaust manifold, said valve controlling the supply of secondary air from the air pumping means to the exhaust manifold in response to the deflection of said diaphragm; and

a passage directly connecting said second chamber to said intake manifold in a position downstream of a throttle valve in a carburetor, said passage having a second restricted orifice therein.

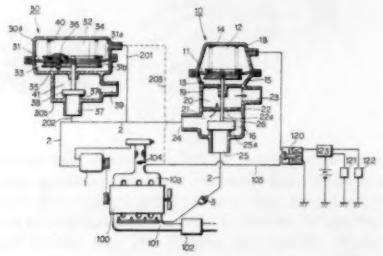
---

4,147,033

## SECONDARY AIR SUPPLY SYSTEM FOR INTERNAL COMBUSTION ENGINES

Motohisa Miura, Kariya, and Mikiji Ito, Nagoya, both of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Dec. 6, 1977, Ser. No. 858,625
Claims priority, application Japan, Dec. 8, 1976, 51-147380
Int. Cl.[2] F01N *3/10*
U.S. Cl. 60—290 4 Claims



1. A secondary air supply system for an internal combustion engine comprising:

an air pump driven by an engine for pumping out the pressurized air;

a secondary air supply line connecting said air pump with an exhaust pipe of said engine for supplying the air from said air pump to said exhaust pipe as a secondary air; and

a relief pressure control valve connected to said secondary air supply line for controlling the pressure of the air in said secondary air supply line,

wherein said relief pressure control valve comprises:

upper and lower casings;

a diaphragm interposed between said upper and lower casings for defining therein first and second pressure chambers, said first pressure chamber being supplied with the air from said air pump;

a spring for biasing said diaphgram towards said second pressure chamber;

an orifice communicating said first pressure chamber with said second pressure chamber for making the pressure in said second pressure chamber equal to that in said first pressure chamber;

a relief port connected at one end to said secondary air supply line and communicated at the other end to the atmosphere;

a valve head connected to and driven by said diaphragm for opening and closing said relief port in cooperation with said other end thereof, said valve head being normally biased by said spring to close said relief port, whereby said relief port is opened in a stable running operation of said engine when the pressure of the air from said air pump exceeds a biasing force of said spring,

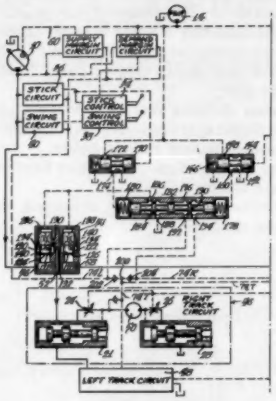
a rapid pressure increase of the air from said air pump caused by the acceleration of said engine producing a pressure difference in said first and second pressure chambers, said pressure difference working on said diaphragm to bias said valve head to close said relief port, whereby said relief port is opened during the acceleration of said engine when the pressure of the air from said air pump exceeds another biasing force of a sum of said biasing force of said spring and said pressure difference.

4,147,034

## HYDRAULIC SYSTEM WITH PRIORITY CONTROL

Howard L. Johnson, Joliet, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Apr. 19, 1978, Ser. No. 897,893
Int. Cl.[2] F15B *11/16, 13/09*
U.S. Cl. 60—422 9 Claims



1. In a hydraulic system, the combination of:

a pressure and flow compensated pump;

a source of pilot fluid under pressure;

a plurality of hydraulic circuits, each including a work performing means;

a plurality of controls, one for each circuit, each including a pilot operated flow valve for connecting the associated work performing means to said pump and an operator positioned valve connected to said source for selectively directing pilot fluid to the corresponding flow valve;

each work performing means and the corresponding flow valve being connected in parallel with respect to the other flow valves and work performing means;

means connected to said work performing means and said pump for controlling said pump to supply fluid at a pressure in excess by a predetermined margin of that required by any of said work performing means; and

priority determining means connected to said source and to at least one, but not all, of said operator positioned valves for changing a pressure characteristic of the pilot flow to the operator positioned valve(s) to which it is connected whenever the pressure of the supply fluid from said pump does not exceed the pressure required by any of said work performing means by said predetermined margin to cause the flow valve(s) associated with said operator positioned valve(s) to which it is connected to decrease flow to the associated work performing means;

whereby priority of supply fluid flow to the work performing means not associated with said priority determining means is assured.

---

4,147,035

## ENGINE LOAD SHARING CONTROL SYSTEM

M. Samuel Moore, and Charles F. Paluka, both of Northridge, Calif., assignors to Semco Instruments, Inc., North Hollywood, Calif.

Filed Feb. 16, 1978, Ser. No. 878,304
Int. Cl.[2] F01B *21/02;* F02D *25/00*
U.S. Cl. 60—711 18 Claims

1. A turbine engine load sharing system comprising:

a first turbine engine including a first fuel control unit;

a second turbine engine including a second fuel control unit;

electronic means for providing a variable input control

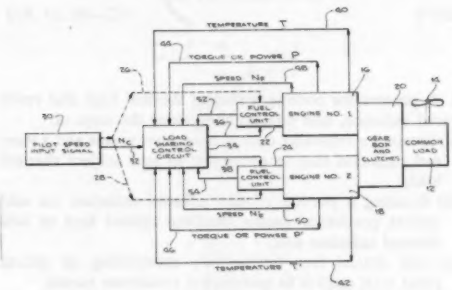
signal from to select the desired engine output speed for both of said two engines;

first and second electronic temperature transducer means for indicating the operating temperature of said first and second engines, respectively;

first and second electrical means for indicating the output power of said first and second engines, respectively;

first and second electrical speed transducers for indicating the operating speed of said first and second engines, respectively;

electronic control means for receiving (1) said pilot speed control signal, (2) said engine temperature signals, (3) said engine output power signals and (4) said engine output speed signals;




means for connecting said electronic control means to vary individually the fuel supplied by said first and second fuel control units;

said electronic control means including (1) circuit means for reducing the fuel supplied by the fuel control unit to either engine which is above its predetermined temperature limit; (2) circuit means for limiting the total power supplied by said two engines; (3) circuit means for conforming the speed of at least one of said engines substantially to the speed selected by the pilot; (4) circuit means for substantially equalizing the power supplied by said two engines.

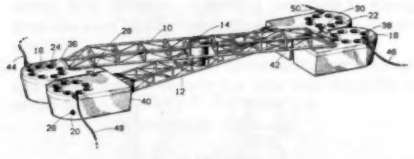
---

**4,147,036**

## SCISSOR WELL TEMPLATE

**J. Robert Worrell, and Mark Y. Berman, both of Tulsa, Okla., assignors to Standard Oil Company (Indiana), Chicago, Ill.**

**Filed Sep. 2, 1977, Ser. No. 830,223**
**Int. Cl.[2] E02B *17/02***
**U.S. Cl. 405—205** **4 Claims**



1. A well template for use as a guiding means in the drilling of wellbores or installation of piles in the sea floor which comprises:

a first arm member;

an arm member well template at one end of and fixed to said first arm member;

a second arm member;

a second arm member well template at at least one end of and fixed to said second arm member;

flotation means for supporting said first arm member and said second arm member;

pivot means intermediate the ends of said arm members and connecting said first arm member and said second arm member.

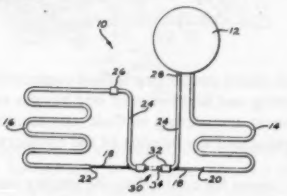
---

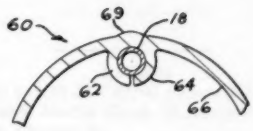
**4,147,037**

## HIGH EFFICIENCY HEAT EXCHANGE FOR REFRIGERATION SUCTION LINE/CAPILLARY TUBE ASSEMBLY

**Robert B. Gelbard, and Raymond M. Schreck, both of Louisville, Ky., assignors to General Electric Company, Louisville, Ky.**

**Continuation-in-part of Ser. No. 736,111, Oct. 27, 1976, abandoned. This application Feb. 21, 1978, Ser. No. 879,543**
**Int. Cl.[2] F25B *41/00, 41/06***
**U.S. Cl. 62—113** **4 Claims**






1. A method for providing heat exchange between the capillary tube and suction line of a refrigeration system, which method comprises:

providing a suction line having a pair of longitudinal ridges extending from the interior surface of the line toward the center of the line and cooperating with the portion of the interior surface therebetween to form a generally U-shaped internal channel of at least approximately two feet in length;

placing the capillary tube within the U-shaped internal channel along at least approximately two feet thereof; and

deforming the ridges so that the ridges substantially surround the capillary tube by forcing a closure tool having a tool channel of tapering width on the exterior surface thereof through the suction line, orienting said tool so that the ridges enter the wider end of the tool channel in undeformed condition and emerge from the narrower end of the tool channel in deformed condition.

---

**4,147,038**

## AUXILIARY COOLING APPARATUS

**Richard F. Hoebing, 2424 Spruce, and Robert L. Ledbetter, 2058 Lind St., both of Quincy, Ill. 62301**

**Filed Nov. 21, 1977, Ser. No. 853,058**
**Int. Cl.[2] F25D *17/00***
**U.S. Cl. 62—180** **7 Claims**

1. In an arrangement for cooling a refrigerated enclosure surrounded by top, bottom and side walls and cooled by a primary thermostatically controlled refrigeration system, an auxiliary cooling system comprising:

a warm, heated enclosure including top, bottom and side walls;

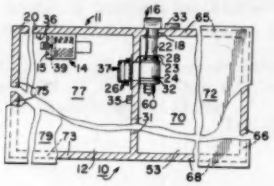
blower means mounted within said heated enclosure and having an inlet and an outlet;

means defining an inlet opening in the walls of said heated enclosure;

inlet conduit means connecting in fluid communication with inlet opening and said inlet of said blower means;

intake means connecting in fluid communication said inlet opening and a source of cold air;

means defining an outlet opening in the walls of said heated enclosure;



outlet conduit means connecting in fluid communication said outlet opening and said outlet of said blower means;

discharge means connecting in fluid communication said outlet opening and the interior of the refrigerated enclosure; and

thermostatic means for controlling the turning on and off of said blower means.

---

**4,147,039**

## ASSEMBLY AND CONTROL SYSTEM FOR MANUFACTURING AND SEPARATING ICE CUBES

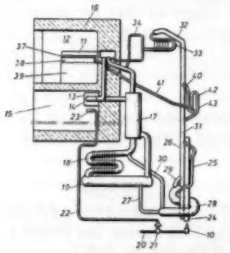
**Peter E. Blomberg, Stockholm, Sweden, assignor to Aktiebolaget Electrolux, Stockholm, Sweden**

**Filed Aug. 25, 1977, Ser. No. 827,726**

**Claims priority, application Sweden, Aug. 27, 1976, 7609525**

**Int. Cl.[2] F25C** *5/08;* **F25B** *47/00;* **F25D** *23/12;* **F25B** *15/10*

**U.S. Cl. 62—349** **17 Claims**



1. An assembly and control system for manufacturing and separating ice cubes performed by an absorption refrigeration apparatus having a freezing means provided with a water supplied ice making device having an ice tray comprising: means for transferring energy from said ice making device to said absorption refrigeration apparatus for freezing ice in said ice tray, means for transferring energy from said refrigerating apparatus to said ice making device for releasing the ice in said ice tray, a control device for said ice making device, and means for controlling said control device and its water supply by energy transfer by operating media of said refrigerating apparatus.

**4,147,040**

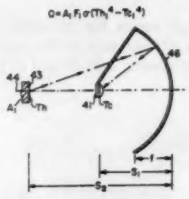
## RADIATION COOLING DEVICES AND PROCESSES

**Gerald Altman, 41 Westminster Rd., Newton, Mass. 02159**

**Division of Ser. No. 445,052, Feb. 25, 1974, Pat. No. 3,861,384, and a continuation-in-part of Ser. No. 422,426, Dec. 6, 1973, abandoned. This application Apr. 23, 1976, Ser. No. 679,858**

**Int. Cl.[2] F25B** *21/02;* **G01J** *1/04*

**U.S. Cl. 62—467 R** **12 Claims**



1. A process for cooling a subject thermal load that emits infrared radiation, said process comprising the steps of:

(a) locating a reflecting optical condenser means and a thermal radiation sink in proximity to said subject thermal load;

(b) focusing a portion of said infrared radiation via said optical condenser means onto the optical face of said thermal radiation sink;

(c) said optical face substantially constituting an optical point with respect to said optical condenser means;

(d) said optical face substantially constituting a black body with respect to said portion of infrared radiation;

(e) conducting a flow of heat from said optical face via an active heat exchanger;

(f) said flow of heat representing a substantial proportion of said portion of said infrared radiation.

---

**4,147,041**

## UNIVERSAL JOINT

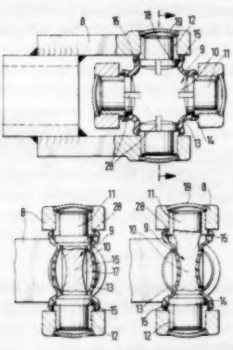
**Sobhy Girguis, Troisdorf-Oberlar; Werner Krude, Neunkirchen, and Peter Harz, Hennef, all of Fed. Rep. of Germany, assignors to Uni-Cardan AG, Siegburg, Fed. Rep. of Germany**

**Filed Jan. 18, 1977, Ser. No. 760,369**

**Claims priority, application Fed. Rep. of Germany, Apr. 28, 1976, 2618536**

**Int. Cl.[2] F16D** *3/26*

**U.S. Cl. 64—17 A** **4 Claims**



1. A universal joint comprising a cruciform trunnion having a body portion and a surface thereon, a plurality of trunnion pins extending from said body portion and received in bores of yoke arms, there being grooves in said surface to said trunnion pins, bearing means on said trunnion pins axially positioned in said bores, a single flexible seal enclosing the surface of said trunnion body and sealingly contacting said bearing means,

said seal being liftable from the surface of said trunnion body to define a reservoir for lubricant between said trunnion body surface and said seal such that the flexible seal constantly applies a pressure to the lubricant in the reservoir to cause the lubricant to flow continuously through said grooves toward the trunnion pins.

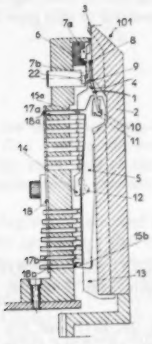
---

**4,147,042**

## SELECTION MECHANISM OF CIRCULAR KNITTING-MACHINE

**Norbert P. Bourgeois, Troyes, France, assignor to ASA S.A., Roanne, France**

**Filed Aug. 4, 1977, Ser. No. 821,835**
**Claims priority, application France, Aug. 6, 1976, 76 24347**
**Int. Cl.[2] D04B *15/68***
**U.S. Cl. 66—231** **5 Claims**



1. A mechanism for selecting and controlling the needles of a circular knitting machine comprising, at each feed of the machine:

a knitting needle;

a cam path;

a swing jack pivoted to the bottom of the needle;

a projecting butt disposed on the swing jack and selectively engageable with said cam path;

a selector jack operatively associated with the swing jack;

a selector butt and a complementary eraser butt symmetrically disposed on said selector jack about its midpoint;

a selector lever positively engaging the selector butt, the selector lever adapted to move the selector jack and hence the swing jack, whereby the swing jack butt engages the cam path to bring the needle into an operative position; and

an eraser lever positively engaging the eraser butt, the eraser lever adapted to move the selector jack and hence the swing jack, whereby the swing jack butt is disengaged from the cam path to bring the needle into an inoperative position,

the selector and eraser levers cooperating with the selector and eraser butts of the selector jack over the entire length of the feed.

---

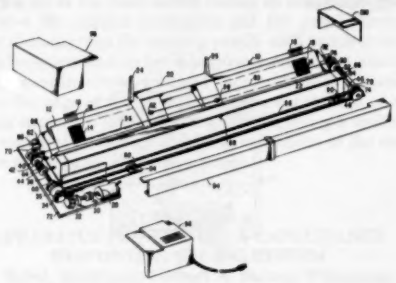
**4,147,043**

## CARRIAGE DRIVE FOR A FLAT BED KNITTING MACHINE

**Henry Schaeflern, Pittstown, N.J., assignor to The Singer Company, New York, N.Y.**

**Filed Feb. 27, 1978, Ser. No. 881,312**
**Int. Cl.[2] D04B *7/00***
**U.S. Cl. 66—60 R** **10 Claims**

1. A carriage drive for a flat bed knitting machine including a reversible electric motor, a driving connection between the motor and carriage including a pair of capstans and rope having portions affixed to the carriage and portions wrapped around the capstans so as to unwind from one capstan and wind up on the other when the motor turns thereby causing the carriage to be moved across the bed of the machine in a direction determined by the direction of rotation of the motor, the carriage affixed rope portions being connected to opposite end portions of the carriage and being arranged to extend there-



from in opposite directions across substantially the entire length of the carriage to locations adjacent the ends of the machine bed enabling the carriage to be moved by the rope into positions extending beyond the bed and the said locations adjacent to ends of the bed.

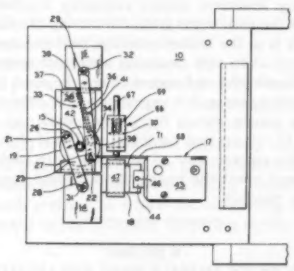
---

**4,147,044**

## SAFE DOOR LOCKING ARRANGEMENT

**Frank J. Bernath, Morton Grove, Ill., assignor to A & B Safe Corporation, Chicago, Ill.**

**Filed Jul. 7, 1977, Ser. No. 813,498**
**Int. Cl.[2] E05B *63/14***
**U.S. Cl. 70—119** **10 Claims**



1. An improved locking arrangement,

said arrangement comprising door means to be selectively locked or opened,

first locking bolt means extendable beyond the periphery of said door means,

handle means on said door means for use in pulling said door open and for selectively operating said first locking bolt means to an extended position or to a retracted position relative to the periphery of said door means,

lock means having a locked condition and an unlocked condition on said door means spaced apart from said handle means,

said lock means including second locking bolt means having an extended and retracted position, and

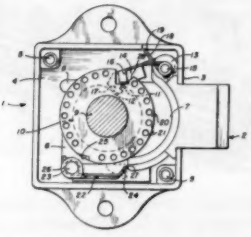
said second locking bolt means in the extended position being directly in the path of said first locking bolt means, thereby preventing said first locking bolt means from going to the retracted position from the extended position.

**4,147,045**

## COMBINATION LOCK WITH SCRAMBLER

**Frank J. Testa, Southington, Conn., assignor to Lori Engineering Corporation, Southington, Conn.**

**Filed Feb. 6, 1978, Ser. No. 875,237**
**Int. Cl.[2] E05B *37/00***
**U.S. Cl. 70—314** **4 Claims**



1. In a combination lock of the type including a lock casing and a cover for the casing, and having notched rotatably mounted tumblers, a notched rotatably mounted drive plate, a bolt plate and bolt movable between locked and unlocked positions, a lever pivotally mounted to said bolt plate and having a fence for engagement with said tumbler notches and a dog for engagement with said drive plate notch to allow movement of said bolt to said unlocked position, the improvement comprising a scrambling mechanism comprising:

a detent on at least one of the tumblers;

rod means having one end rotatably mounted to said bolt plate and a second end adapted to engage said detent, said rod means being urged inwardly toward the tumbler by spring means to engage the detent when the lock is in the unlocked position;

camming abutment means for allowing said second end of said rod to engage said detent when the combination lock is in the open position, said camming abutment means extending from said cover into the interior of the lock, the camming abutment means engaging the rod means to prevent the rod means from contacting the tumbler when the lock is in the locked position, said rod means moving with respect to said camming abutment means to a position wherein the rod means moves beyond the camming abutment means and is urged into said detent;

bolt plate return means for driving said rod against said detent to rotate said tumblers and said drive plate and upset the engagement of said dog with said drive plate notch and upset the engagement of said fence with said tumbler notches.

---

**4,147,046**

## HEAVY DUTY MOBILE PIPE STRAIGHTENING MACHINE OF RELATIVELY LIGHT-WEIGHT CONSTRUCTION

**Joe F. Blattler, Edmonton, Canada, assignor to International Tool and Supply Co. Inc., Houston, Tex.**

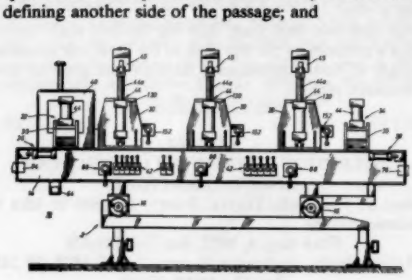
**Continuation of Ser. No. 717,002, Aug. 23, 1976, abandoned.**
**This application Jan. 16, 1978, Ser. No. 870,039**
**Int. Cl.[2] B21D *3/04***
**U.S. Cl. 72—68** **33 Claims**

1. A mobile pipe straightening machine of particularly light-weight construction for increased transportability in field usage, comprising:

(a) an elongate, trough-shaped bed frame defining a bed space therein;

(b) a drive roll assembly including at least one power driven drive roll disposed within the bed space and which defines one side of an elongate passage for the pipe to be straightened, said drive roll being in a skewed orientation with respect to the longitudinal axis of said passage;

(c) first and second idler roll assemblies movably coupled to the bed frame and respectively including first and second spaced idler rolls positioned transversely of said axis and defining another side of the passage; and



(d) means for driving said at least one drive roll to thereby effect a rolling traversal of said pipe through the passage.

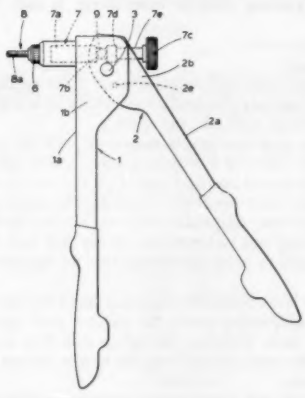
---

**4,147,047**

## TOOL FOR SETTING THREADED BUSHES

**James F. Fluester, Gillingham, England, assignor to Spiralux Limited, England**

**Filed Nov. 29, 1977, Ser. No. 855,665**
**Int. Cl.[2] B21J *15/34***
**U.S. Cl. 72—114** **12 Claims**



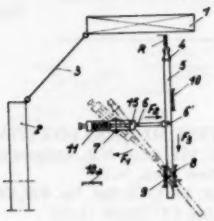
1. A tool for setting threaded bushes, the tool comprising a body portion, a mandrel puller rotatably and slidably mounted in the body portion, a mandrel fixed, by means of a screw-threaded engagement, to the mandrel puller for rotational and sliding movement therewith, and means for sliding the mandrel relative to the body portion, the free end portion of the mandrel being screw-threaded for engagement with a threaded bush, the threaded bush being settable by sliding the mandrel puller relative to the body portion so that the threaded bush strikes the body portion, is arrested thereby, and is expanded upon further movement of the mandrel puller, and the threaded bush is releasable from the mandrel by rotation of the mandrel puller relative to the body portion, wherein the screw thread at the free end portion of the mandrel is of opposite hand to that fixing the mandrel to the mandrel puller.

4,147,048

## MACHINES FOR THE MANUFACTURE OF SPRINGS FITTED WITH EYELETS OR HOOKS

Jacques Herckelbout, 8, Rue Mirabeau, Paris 75, France

Continuation of Ser. No. 806,636, Jun. 30, 1977, abandoned.
This application Jul. 3, 1978, Ser. No. 921,406
Claims priority, application France, Jun. 18, 1976, 76 18537
Int. Cl.[2] B21F 3/027, 35/02
U.S. Cl. 72—137 7 Claims



1. In a machine, for manufacturing helical wire springs having at one end a first hook positioned in a plane passing through the axis of the helix, and at the other end a second hook positioned in extension of the last turn of the helix, in combination:

(i) a spring-producing means adapted to produce an unfinished blank of the spring in a first position in which the axis of the helical spring coincides with a first line.

(ii) a means for straightening said second hook, said straightening means requiring the positioning of the unfinished blank in a second position in which the axis of the helical spring coincides with a second line in a common plane with, but at an angle to, said first line

(iii) transfer means for gripping said unfinished blank in said first position and transferring it to said second position, said transfer means being arranged to carry out a linear movement away from said first position along said first line, then an angular movement from coincidence with said first line into coincidence with said second line, and then a linear movement along said second line into said second position.

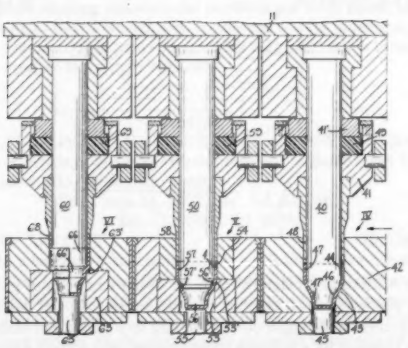
---

4,147,049

## DRAWING HEAVY WALLED PARTS

Walter R. Book, Bethlehem, and Anthony M. Putetti, Waterbury, both of Conn., assignors to Textron, Inc., Providence, R.I.

Filed Jun. 16, 1977, Ser. No. 807,072
Int. Cl.[2] B21D 22/00
U.S. Cl. 72—349 4 Claims



1. A multiple plunger machine for drawing heavy walled parts without annealing comprising a plurality of dies mounted in a fixed support, a plurality of punches carried by a movable support constituting a series of stations, means for reciprocating said movable support and means for advancing a flat workpiece blank from a first blanking station to the series of punch and die stations, the punch and die at the second station being adapted to cup the blank and form the bottom of the workpiece, the die at the third station having an enlarged die angle to receive the cupped workpiece and the punch having a smaller diameter than the cupping punch, each punch at one or more subsequent stations being positively driven and provided with an annular sleeve mounted therewith in a position to contact the edge of the workpiece at or near the end of each drawing stroke and the sleeve mounting including a resiliently compressible mass located to permit movement of the sleeve relative to the positively driven punch.

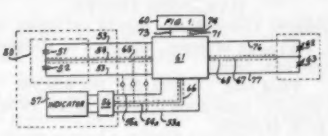
---

4,147,050

## APPARATUS FOR TESTING A CAPACITANCE RESPONSIVE GAGING SYSTEM

Ira A. Rubel, Smithtown; Herbert A. Steiner, Whitestone, and Charles H. Ritter, Ronkonkoma, all of N.Y., assignors to Gull Airborne Instruments, Inc., Smithtown, N.Y.

Division of Ser. No. 670,141, Mar. 25, 1976, Pat. No. 4,080,562.
This application Dec. 1, 1977, Ser. No. 856,482
Int. Cl.[2] G01G 25/00
U.S. Cl. 73—1 H 6 Claims



1. Apparatus for testing a gaging system which includes a capacitor, an indicator, and means for operating the indicator in accordance with the capacitance of the capacitor, said apparatus comprising:

a. a manually variable simulating capacitor;

b. capacitance measuring means; and

c. switch means shiftable between:

(1) a first position in which the gaging system capacitor is connected to the capacitance measuring means;

(2) a second position in which the simulating capacitor is connected to the capacitance measuring means;

(3) a third position in which the gaging system capacitor is connected to the indicator operating means; and

(4) a fourth position in which the simulating capacitor is connected to the indicator operating means.

---

4,147,051

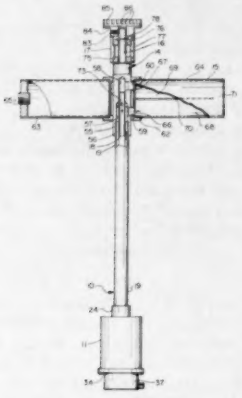
## DENSIMETER

John S. Griffiths, Ottawa, and Roger N. Stone, Stittsville, both of Canada, assignors to Sharon Electronics Limited, Ottawa, Canada

Filed Jun. 22, 1977, Ser. No. 809,037
Int. Cl.[2] G01N 9/30
U.S. Cl. 73—32 R 17 Claims

1. A densimeter comprising a substantially vertical shaft having a central axis, means for rotating the shaft about its axis, a vessel for containing a liquid sample mounted on the shaft asymmetrically with respect to the shaft axis, counterbalancing means for at least partly compensating for the asymmetry, the shaft being resiliently mounted with freedom of oscillation transverse to the axis, and means for measuring the amplitude of the oscillations, said measuring means including two radiation paths each of which comprises a source and a detector, a shutter carried by the shaft and disposed to interrupt the radiation paths to generate two waveforms as the shaft rotates and means for detecting a shift in phase between the two wave-

forms, whereby the phase shift is proportional to the amplitude of the oscillations which, in turn, is proportional to the deviation of the specific gravity of the sample from a reference value.



---

**4,147,052**

## HARDNESS TESTER

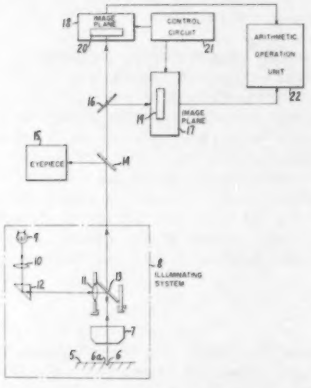
**Junpei Tsujiuchi; Toshio Honda, both of Kanagawa, and Hiroshi Okuda, Tokyo, all of Japan, assignors to Kabushiki Kaisha Daini Seikosha, Japan**

**Filed Aug. 17, 1977, Ser. No. 825,398**

**Claims priority, application Japan, Aug. 19, 1976, 51-99051; Aug. 19, 1976, 51-99050**

**Int. Cl.[2] G01N *3/42***

**U.S. Cl. 73—81** **6 Claims**




1. A hardness tester for determining hardness of a specimen, comprising: indenting means for forming a polygonal pyramidal indentation in a surface of a speciman; imaging means for forming an optical silhouette image of the speciman surface indentation; a solid state image sensor comprised of a plurality of photoelectric sensor elements, each photoelectric sensor element having a narrow elongated photoresponsive area and said plurality of photoelectric sensor elements being relatively positioned with their respective photoresponsive areas positioned along a straight line defining a major axis of said solid state image sensor and with the lengths of their respective photoresponsive areas transverse to the major axis of said solid state image sensor, and said solid state image sensor positioned with the optical image of the specimen surface indentation incident on the photoresponsive areas of said photoelectric sensor elements comprising said solid state image sensor with said photoelectric sensor elements developing respective electrical output signals each having an amplitude representing the intensity of the optical image incident thereon; and detecting means responsive to the differences in amplitude of the electrical output signals developed by said photoelectric sensor elements in the vicinity of the ends of the speciman surface indentation image for detectingthe diagonal length of the speciman surface indentation image along the major axis of said solid state image sensor.

---

**4,147,053**

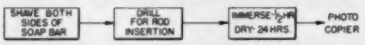
## WET CRACK TEST METHOD FOR SOAP BARS

**Cesare N. Marchesani, Maywood, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.**

**Filed Jun. 14, 1978, Ser. No. 915,438**

**Int. Cl.[2] G01B *11/30***

**U.S. Cl. 73—104** **8 Claims**




1. A method of testing the wet crack performance of soap bars comprising the steps of shaving at least one face of a soap bar to be tested, drilling a hole through said bar, inserting a rod in said hole, suspending said bar by said rod in a water bath, air drying said soap bar, and then placing said bar in a flat bed photocopier shaved face downwardly and photocopying said shaved face of said soap bar to obtain a permanent graphical representation of the wet cracking of said soap bar.

---

**4,147,054**

## METHOD AND APPARATUS FOR DETERMINING THE UPPER DEAD-CENTER POSITION WITH PISTON ENGINES

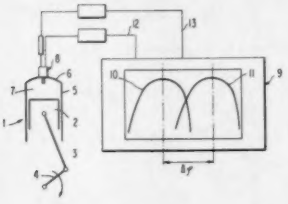
**Günter Hohenberg, Hohengehren, and Detlef Kurr, Waiblingen, both of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany**

**Filed Dec. 2, 1977, Ser. No. 856,977**

**Claims priority, application Fed. Rep. of Germany, Dec. 4, 1976, 2655064**

**Int. Cl.[2] G01M *15/00***

**U.S. Cl. 73—117.3** **19 Claims**

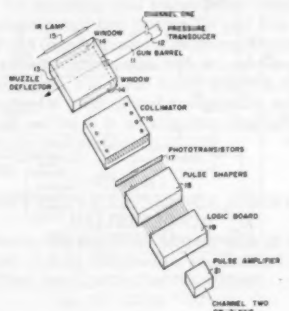


1. A method for determining the upper dead-center position of a piston in piston engines, comprising the steps of determining a crankshaft angle corresponding to a maximum compression pressure by a pressure measurement, and adding a correcting factor that corresponds to a thermodynamic loss angle conditioned by heat transfer and leakage losses.

## 4,147,055
## APPARATUS FOR DETERMINING PROJECTILE POSITION AND BARREL PRESSURE CHARACTERISTICS

**Stanley E. Wood, Inyokern, Calif.; Kenneth L. Moore, Tallahassee, Fla., and William L. Black, China Lake, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Dec. 15, 1977, Ser. No. 860,814**
**Int. Cl.[2] G01L *5/14***
**U.S. Cl. 73—167** **37 Claims**




1. A physical pressure instrument for measuring pressure-travel relationships comprising:

barrel means having a finite bored length communicating with a chamber at one end and open at the opposite end for establishing the direction of travel of a projectile;

a projectile contained in said bore of said barrel means for establishing a measurable position point, said projectile including a base, an engraving band attached to said base so as to be an integral part of said base, an extension having an end joined to said base, and a sealant circumferentially surrounding said base;

optical means positioned with respect to the open end of said barrel means for providing measurable wave energy to establish a datum plane which datum plane is perpendicular to said direction of travel;

detector means positioned in said datum plane at the open end of said barrel means for measuring said wave energy incident thereon;

pressure measuring means located in said barrel means for determining pressure at selected points along said barrel means; and

read out means effectively connected to said pressure measuring means and said detector means for displaying position and pressure data, said read out means includes:

pulse shaping circuitry for producing a level pulse; and

a logic board electrically connected to said pulse shaping circuitry for converting said level pulses into a series of pulses in a single channel.

---

## 4,147,056
## MULTI-SEGMENT HEAD-UP DISPLAY FOR AIRCRAFT

**Hans R. Muller, Kirkland, Wash., assignor to Sundstrand Data Control, Inc., Redmond, Wash.**

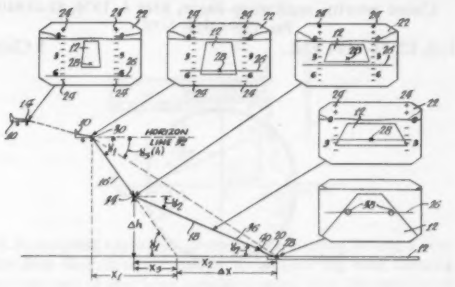
**Filed Sep. 23, 1977, Ser. No. 836,012**
**Int. Cl.[2] G01C *21/00***
**U.S. Cl. 73—178 T** **10 Claims**

1. In a head up visual approach aircraft instrument having a screen on which the pilot of an aircraft views a collimated display of flight guidance information against a background of the outside world, the display including a pitch stabilized reference indicia, flight path indicia movable vertically on the screen representing the flight path of the aircraft, for alignment with a pilot-selected outside world aiming point by manipulation of the attitude and speed of the aircraft, to follow an approach path to the point of initiation of a flare maneuver, said approach path having two successive straight line segments, the first being at a steeper angle than the second, and the second being directed toward said aiming point, an improved means for positioning said flight path indicia, comprising:

means for establishing the angles of said approach path segments;

means for measuring the aircraft altitude;

means for positioning said flight path indicia on the screen during the first segment of the approach in accordance




with a first approach path command which is a function of the aircraft altitude and the selected angles of the approach path segments, for the flight path of the aircraft to follow the first approach path segment as the pilot maintains said indicia in alignment with said aiming point; and

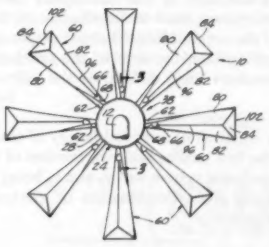
means for positioning said flight path indicia on the screen during the second approach segment in accordance with a second approach path command which is a function of the angle of the second approach segment for the aircraft to follow the second approach path segment as the pilot maintains said indicia in alignment with said aiming point.

---

## 4,147,057
## WIND COMPONENT ANEMOMETER

**Thomas Y. Palmer, 823 S. Ridge Dr., Fallbrook, Calif. 92028**

**Filed Sep. 21, 1977, Ser. No. 835,366**
**Int. Cl.[2] G01W *1/00***
**U.S. Cl. 73—189** **22 Claims**



1. An anemometer for measuring the component of air or similar fluid speed along its axis of rotation, comprising:

(a) a rotatable hub;

(b) a plurality of helicoidal airfoils extending outwardly from said hub, each having a plurality of helicoidal edges, said edges being sharp and formed by the intersections of two or more substantially plane surfaces; and

(c) relatively narrow cutouts formed in each of said airfoils adjacent the hub ends of said airfoils, the cutouts being generally axially disposed and positioned along the peripheral surface of said hub so that the component of air flow across the rotating hub and through the cutouts generates vorticity directed along the blades so as to

neutralize the vorticity produced by the aerodynamic lift forces on the blades, whereby the airfoils respond to the component of wind along the axis of rotation.

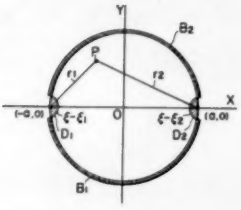
---

**4,147,058**

## ELECTROMAGNETIC FLUID FLOWMETER OPERABLE WITH FREE FLUID SURFACE

**Shigetada Matsushita, Kawasaki, Japan, assignor to Fuji Electric Co., Ltd., Kawasaki, Japan**

**Filed May 4, 1977, Ser. No. 793,910**
**Claims priority, application Japan, May 6, 1976, 51-51540**
**Int. Cl.[2] G01F *1/58***
**U.S. Cl. 73—194 EM** **5 Claims**




1. An electromagnetic fluid flowmeter of the type comprising two arc-shaped electrode plates disposed horizontally opposite each other on the internal periphery of a tubular fluid conduit, means for establishing a magnetic field within the conduit the intensity of which in a given direction is a function of its position (x,y) in a cross-sectional plane of the conduit, and detecting means connected to the electrode plates for detecting the current flowing therebetween as a conductive fluid flows through the conduit, the improvement comprising a pair of convex electrically insulating members vertically disposed opposite each other on the internal periphery of the conduit and individually interposed between the respective adjacent edges of the electrode plates, the arcs of the inner surfaces of the electrode plates being defined by the following equation:

$$(y+y_o)^2+x^2=a^2+y_o^2$$

which is the equation of a first family of circles through two poles $(-a,0)$ and $(a,0)$ in the rectangular coordinate system superimposed on said cross-sectional plane of the conduit with the center of the conduit located at the origin of the rectangular coordinate system, the arcs of the outer surfaces of said insulating members being defined by the following equation:

$$y^2+(x-x_o)^2=x_o^2-a^2$$

which is the equation of a second family of circles orthogonal to those of the first family, said two families of circles defining a bipolar coordinate system and $y_o$ and $x_o$ being predetermined constants for a given combination of electrode plates and insulating members.

---

**4,147,059**

## DIGITAL LIQUID VELOCITY MEASURING SYSTEM

**George H. Fathauer, Mesa, Ariz., assignor to Medtronic, Inc., Minneapolis, Minn.**

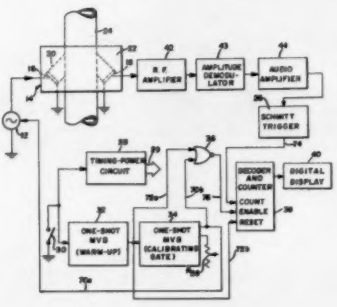
**Filed Jan. 9, 1978, Ser. No. 867,949**
**Int. Cl.[2] G01F *1/66***
**U.S. Cl. 73—194 A** **8 Claims**

1. An ultrasonic wave system for measuring the velocity of a liquid with acoustic reflection centers flowing through a selected one of a plurality of conduits of differing cross-sectional area, said system comprising:

(a) first and second transducer elements operatively associated with the selected conduit respectively for transmitting an ultrasonic wave into the liquid flowing through the conduit and for receiving an ultrasonic wave backscattered by the liquid directed through the conduit:

(b) selectively actuatable generator means for applying a high frequency signal to said first transducer element causing it to emit the ultrasonic wave into the liquid;

(c) said second electro-acoustical transducer element providing an electrical output signal of a frequency shifted from that high frequency of said generator means by the Doppler phenomenon, dependent upon the velocity of the liquid directed through the conduit:




(d) first means coupled to receive the electrical output of said second transducer for providing an amplitude demodulated series of pulse-like output signals;

(e) second means responsive to the demodulated output signal for counting the pulse-like signals during a variable calibrating period to provide a manifestation of the velocity of the liquid directed through the conduit; and,

(f) third means operator-manipulatable for actuating said second means to initiate a calibrating period and means for varying the calibrating period in accordance with the cross-sectional area of the selected conduit.

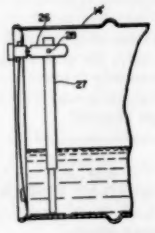
---

**4,147,060**

## ADJUSTABLE FRAME LIQUID LEVEL MEASURING DEVICE

**William F. Fling, 351 S. Fuller Ave. Apt. 35, Los Angeles, Calif. 90036, and Paul A. Stolzke, P.O. Box 878, Lawndale, Calif. 90260**

**Filed Feb. 6, 1978, Ser. No. 875,541**
**Int. Cl.[2] G01F *23/08***
**U.S. Cl. 73—321** **10 Claims**




1. In a liquid level measuring device for measuring the level of a liquid in a container, said device comprising indicator means adapted for mounting on a container for providing a visual reading related to the level of the liquid in a container; a frame connected to said indicator means and being adapted for mounting in a container; a buoyant float adapted for floating on the surface of the liquid; an endless flexible transmission means having a first portion adjacent said indicator means and another portion connected to said float; and means for movably mounting said endless flexible transmission means on said

frame so that movement of said float moves said first portion of said transmission means relative to said indicator means, the improvement comprising:

said frame has first and second elongated frame sections, said first frame section being adapted for mounting within the interior of said container on the wall thereof; said second frame section being adapted to extend to a position adjacent to the lowest point of the interior of said container;

connector means for connecting said second frame section with said first frame section for angular displacement relative to the first frame section within the interior of the container;

said means for mounting said transmission means includes means mounting said first portion on said first elongated section of said frame, means for mounting another portion of said transmission means on said second elongated section of said frame, and guide means adjacent to said connector means for guiding said transmission means when said second section is in an angularly displaced position relative to the first section.

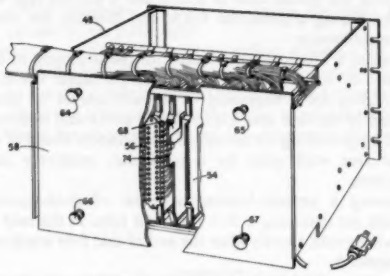
---

**4,147,061**

## THERMOCOUPLE REFERENCE JUNCTION CALIBRATOR

**Douglas J. Wester, and Robert D. Martin, both of Huntsville, Ala., assignors to Avco Corporation, Huntsville, Ala.**

**Filed Jul. 7, 1978, Ser. No. 922,531**
**Int. Cl.[2] G01K 7/12**
**U.S. Cl. 73—341** **6 Claims**



1. In combination with a temperature measuring system of the type having a multiplicity of thermocouple sensors, each comprising a measurement junction and a reference junction, the output of the multiplicity of thermocouple sensors being connected via leadwires to printed circuit boards for multiplexing each channel into a meter or analog-to-digital converter which provides computer compatible processing data, the improvement which comprises:

a multiplicity of edge card connectors, one slipped over the end of each printed circuit board, said edge card connectors serving to encircuit said printed boards with said thermocouple sensors, each of said edge card connectors having a body formed of an insulating medium which contains the electrical circuit completing elements imbedded therein;

means for forming said reference junctions in said edge card connectors, said means comprising use of hold down screws as terminations for said leadwires from the thermocouple measurement junctions, said hold down screws being formed of a material which generates a temperature varying electromotive force when brought in contact with at least one of the leadwires from said measurement junction;

a heat conductive plate physically contacting the back side of all of said multiplicity of edge card connectors, said plate being of sufficient mass to form a heat sink for said edge card connectors; and

an encapsulated temperature sensitive module in proximity to a mid-area point on said heat conductive back plate for measuring the temperature of the entire complement of said edge card connectors, reference junctions and adjacent heat conductive plate.

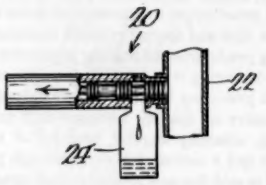
---

**4,147,062**

## LIQUID SAMPLER

**Ben E. Jaeger, Rte. 2, Box 49, Plano, Ill. 60545**

**Filed Mar. 2, 1978, Ser. No. 882,775**
**Int. Cl.[2] G01N 1/14**
**U.S. Cl. 73—422 GC** **13 Claims**



1. A sampling apparatus, comprising a housing having a bore extending therethrough, means for supporting said housing with one end of said bore communicating with the interior of a product containing vessel and with an opposite end of said bore being outside of the vessel; a plunger in the bore and reciprocable therein, said plunger having a recess therein intermediate its ends and of a length longitudinally of said plunger less than the length of said bore; means at said opposite end of said bore connected with said plunger for reciprocating said plunger in said bore to project said recess into said vessel to receive a sample of product therein and to then retract said recess from said vessel to a point in said bore outside of said vessel and intermediate the ends thereof; means at said point in said bore for receiving the sample of product in said recess; means for maintaining a liquid seal between said one end of said bore and said point therein; and seal means on said plunger toward said opposite end of said bore for maintaining a liquid seal between said point in said bore and said opposite end thereof, and therefore between said point and said means for reciprocating.

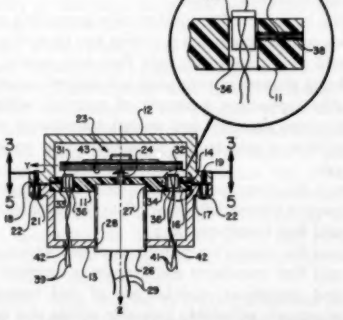
---

**4,147,063**

## TWO AXIS GAS DAMPED ANGULAR VELOCITY SENSOR

**Gerald S. Bower, Templeton; Rex B. Peters, Martinez, and Harold D. Morris, Orinda, all of Calif., assignors to Systron-Donner Corporation, Concord, Calif.**

**Filed Sep. 23, 1977, Ser. No. 836,159**
**Int. Cl.[2] G01P 9/02**
**U.S. Cl. 73—504** **11 Claims**



1. A two axis gas filled angular velocity sensor, comprising a framework, a rotor mounted within and being free to rotate

about a spin axis relative to said framework, a motor mounted within said framework providing a drive torque about said spin axis, a hub coupling said rotor with said drive torque, said rotor having an annular disc shape with a damping face and an opposite pickoff face, means disposed between said rotor and said hub for providing pivoting motion of said rotor about one diameter thereof, a damping plate attached to said hub positioned proximate to and spaced axially from said damping face so that a damping gap is formed therebetween, whereby gas in said damping gap provides damping for said pivoting motion of said rotor, circuit means connected to said motor for controlling said drive torque to provide a constant rotational speed of said rotor, first and second pickoffs mounted in said framework having predetermined angular separation about said spin axis and further being in spaced relation with said pickoff face, said pickoffs providing first and second output signals respectively indicative of spacing between said pickoffs and said pickoff face, whereby angular velocity of said framework about a first and a second axis therethrough provides indication thereof in said first and second output signals respectively, said first and second axes being oriented orthogonally to said spin axis and at said predetermined angular separation.

---

**4,147,064**

## TESTING OF MATERIALS WITH STRESS WAVES

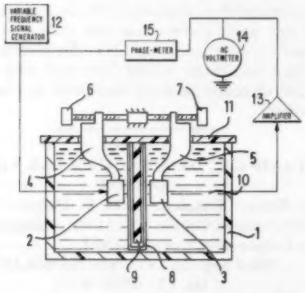
**Robert Bond, Lichfield, England, assignor to Dunlop Limited, London, England**

**Filed Mar. 29, 1977, Ser. No. 782,395**

**Claims priority, application United Kingdom, Apr. 7, 1976, 14209/76**

**Int. Cl.² G01N *29/00***

**U.S. Cl. 73—596** **12 Claims**




1. Apparatus for determining elastic properties of materials comprising

a tank containing a fluid,

a first transducer for continuously generating stress waves,

a second transducer for detecting and receiving waves from said first transducer, said first and second transducers being aligned on a common axis support means for detachably supporting a sample of material within said tank between said first and second transducers such that the surface of said sample is perpendicular to said common axis,

means for electrically exciting said first transducer at a frequency substantially lower than the resonant frequency of said first transducer, and

means for comparing properties of the waves generated by said first transducer and the waves received by said second transducer, at least one of said transducers being accurately adjustably locatable within said tank to detect a minimum (node) or maximum (antinode) of a standing wave set up in said tank.

**4,147,065**

## ULTRASONIC TESTING

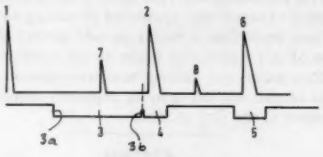
**Dieter Lather, Rheurdt; Klaus-Uwe Janssen, Lintorf; Karl Ries, Mülheim; Peter Möller, Wuppertal, and Ulrich Forstermann, Sprockhoevel, all of Fed. Rep. of Germany, assignors to Mannesmann AG., Dusseldorf and Karl Deutsch Pruf-und Messgeratebau, Wuppertal-Elberfeld, both of, Fed. Rep. of Germany**

**Filed Mar. 7, 1977, Ser. No. 775,159**

**Claims priority, application Fed. Rep. of Germany, Mar. 10, 1976, 2610457**

**Int. Cl.² G01N *29/04***

**U.S. Cl. 73—611** **4 Claims**




1. In a method of processing electrical signals which represent ultrasonic signals, generated pursuant to testing of an object as to flaws by transmission thereto of ultrasonic signals and detecting echos, whereby in each instance and test cycle, at least two echo pulses from the rear wall surface of the object are detected, comprising the steps of:

detecting the transit time of a first and a second rear wall pulse during a particular cycle and forming the transit time difference;

generating a first looking window for the detection of flaw echos during a cycle following the particular cycle, by providing for a beginning of the window at an instant ahead of the first rear wall echo by about said difference and by providing for an end of that window ahead of said first rear wall echo by a particular, relatively small amount;

generating a second looking window of predetermined width for detecting a first rear wall echo in the said following cycle, shortly after the end of said first window as generated;

generating a third looking window of predetermined width for detecting a second rear wall echo in the said following cycle, the third looking window beginning at a delay after the end of the first window as generated, the delay being said transit time difference, so that first and second rear wall echos can be distinguished from any flaw echo; and

using the first and second rear wall echos as actually occuring during the second and third windows as generated, for the generation of the first looking window in the next following cycle as per said generating step.

---

**4,147,066**

## MEANS AND METHOD FOR UNCAGING A GYROSCOPE ROTOR

**Donald O. Bard, Mount Clemens, Mich., assignor to Vought Corporation, Dallas, Tex.**

**Filed Nov. 8, 1976, Ser. No. 739,676**

**Int. Cl.² G01C *19/24;* F41G *7/00;* F42B *15/02;* G06F *15/50***

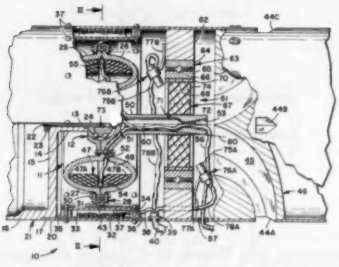
**U.S. Cl. 74—5.1** **6 Claims**

1. For a gyroscope adapted for use in a vehicle intended for a single usage, the gyroscope having a rotor and means for rotationally accelerating the rotor upon its spin axis, relative to a supporting structre, to a predetermined rotational velocity, apparatus for permitting rotational acceleration of the rotor about its spin axis while constraining the rotor against rotation about another axis and, upon the rotor being accelerated to a predetermined rotational velocity, for releasing the rotor to permit its rotation about at least one other axis relative to the supporting structure, the apparatus comprising:

a housing;

a first bearing means, mounted on the housing, for permitting rotation of the rotor upon the rotor spin axis and upon at least one other axis intersecting the spin axis;

constraining means, mounted on the housing and spaced from the first bearing means, for initially constraining the rotor from rotation relative to the housing about the at least one other axis while permitting rotation of the rotor about its spin axis, and for subsequently releasing the rotor, upon the rotor being accelerated to its predeter-



mined rotational velocity, to permit rotation of the rotor relative to the housing about the at least one other axis, the constraining means having a solid propellant structure which comprises a means for caging the rotor prior to release of the rotor; and

means for igniting the solid propellant structure for causing the solid propellant structure to be consumed subsequent to the rotor being accelerated to its predetermined rotational velocity, whereby the rotor is permitted to rotate about the at least one other axis relative to the housing.

---

**4,147,067**

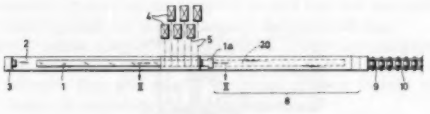
## LINEAR DRIVES

**Karl-Hans Staat, Dusseldorf, Fed. Rep. of Germany, assignor to Friedrich Kocks GmbH & Company, Dusseldorf, Fed. Rep. of Germany**

**Continuation of Ser. No. 626,316, Oct. 28, 1975, abandoned. This application May 3, 1977, Ser. No. 793,244**

**Int. Cl.[2] F16H** *19/04*

**U.S. Cl. 74—29** **4 Claims**



1. A tube push bench fitted with a rack and pinion drive comprising an elongated guide bed, a single gear rack having teeth on one side mounted in said bed for longitudinal displacement thereon, a mandrel rod at one end of said toothed rack driven thereby for longitudinal displacement with said rack for moving a bloom, at least three substantially identical drive pinions simultaneously engaging said teeth of said toothed rack in close packed succession with the distance between adjacent pinion axes being substantially equal to the sum of the radii of the adjacent pinions and separate drive means driving each of said pinions said separate drive means being arranged in staggered manner on one side of the gear rack with the pinion axes parallel to one another.

**4,147,068**

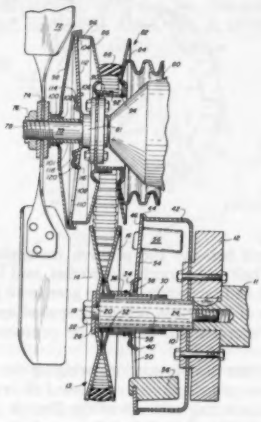
## DRIVE SYSTEM

**Gary A. Woollard, Ithaca, N.Y., and Richard L. Smirl, Arlington Heights, Ill., assignors to Borg-Warner Corporation, Chicago, Ill.**

**Filed Jun. 11, 1975, Ser. No. 585,903**

**Int. Cl.[2] F16H** *55/22*

**U.S. Cl. 74—230.17 E** **3 Claims**



1. Apparatus for driving accessories disposed between a drive shaft connected to an engine in a vehicle and a driven shaft connected to one or more accessories; the combination comprising:

a first variable pulley rotationally associated with the drive shaft and having a fixed flange connected to the drive shaft and a movable flange movable axially of said fixed flange and the drive shaft;

means for moving said movable flange axially away from said fixed flange above a predetermined speed, above zero speed, of the drive shaft;

said moving means comprising a disc spring biasing said movable flange and centrifugally responsive means associated with said disc spring actuated by centrifugal force above said predetermined speed of the drive shaft to change the bias of said spring and effect movement of said movable flange;

a second variable pulley rotationally associated with the driven shaft and the accessories and having a fixed flange connected to the driven shaft and a movable flange movable axially of said fixed flange and said driven shaft;

a disc spring means urging said movable flange of said second pulley axially toward said fixed flange thereof;

drive means between said variable pulleys effective to provide the drive therebetween with the drive ratio between the pulleys determined by the position of the movable flanges with respect to their respective fixed flanges;

said apparatus being constructed and arranged to provide substantially a fixed ratio drive between the drive and driven shafts at relatively low drive shaft speeds and also to provide substantially a constant speed of the driven shaft for speeds for the drive shaft above said predetermined speed thereof throughout the major portion of the normal vehicle operating range;

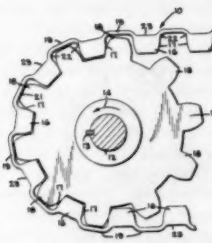
said disc spring being coupled by friction at is outer periphery only to said drive shaft and said disc spring means being coupled by friction at its outer periphery only to said driven shaft.

4,147,069

## GEARED BELT FOR POSITIVE DRIVE TRANSMISSION

William J. Derner, Indianapolis, Ind., assignor to FMC Corporation, San Jose, Calif.

Filed Oct. 1, 1976, Ser. No. 728,802
Int. Cl.[2] F16G 1/00
U.S. Cl. 74—231 C 5 Claims



1. A geared belt for the positive transmission of motion between the belt and a toothed sprocket, said belt comprising,

thick, solid and substantially rigid gear teeth projecting from one side of the belt in repeating spaced apart relationship having lateral tooth faces to be contacted by sprocket teeth,

successive thin flexible portions bridging the spaces between successive gear teeth and connected thereto with longitudinally extending surfaces of the flexible portions on the gear teeth side of the belt defining a dedendum line of the belt gear teeth,

said teeth being substantially stiffer than the thin flexible portions therebetween,

said belt forming a continuous non-articulated band that is subjected to tension stress when in engagement with the sprocket and when transmitting motion to or from the sprocket,

said belt being subjected to bending stresses that are induced by contact between the belt gear teeth and the sprocket teeth when entering or leaving meshing engagement,

said belt being crimped to curve transversely at the junctures between the stiff teeth and the thin flexible portions therebetween with said dedendum line longitudinal surfaces on said one side of the belt merging toward and into said tooth faces in a concave fillet, and the surfaces of said flexible portions on the other side of said belt convexly curving toward said teeth thereby to define indented portions of said belt at said teeth and to offset the other side of said belt and said teeth laterally from the flexible portions so that belt tension induces within the crimped portions of the belt flexural stresses that counteract bending stresses induced therein by contact between the belt gear teeth and the sprocket teeth when entering or leaving meshing engagement.

---

4,147,070

## AUTOMATIC BELT TIGHTENER

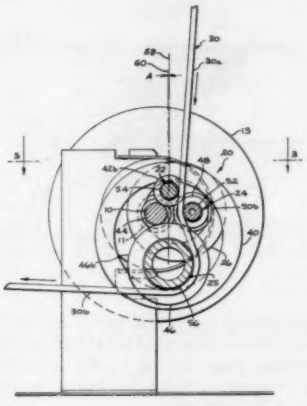
Stephen L. McMillan, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Filed Sep. 15, 1977, Ser. No. 833,774
Int. Cl.[2] F16H 7/10, 7/12
U.S. Cl. 74—242.11 C 8 Claims

1. In a belt drive mechanism for transmitting torque between a driving rotatable member and a driven rotatable member through a drive belt, an automatic belt tightener comprising:

(a) a freely-riding, roller assembly pivotable about the driving member and including first, second, and third rollers, each opposing end of the driving member and three rollers having outside diameter grooves formed respectively by a pair of flanges, reduced interior diameters, and having their longitudinal axes of rotation parallel and spaced a fixed distance apart during operation, the flanges of only the first and third roller being in contact with the driving member, and the second roller being driven by the first and third rollers,

(b) the drive belt passing between and in contact with the reduced interior diameters of the first and second rollers and between and in contact with the reduced interior diameters of the second and third rollers and partially around said third roller and exiting the mechanism therefrom, such that as torque is applied to the driving member



the respective rollers will automatically exert forces against the belt effecting driving engagement therebetween,

(c) a first set of spaced parallel rings each having an interior diameter in rolling contact with the grooves of the driving member and the second roller, and

(d) a second set of spaced parallel rings each having an interior diameter in rolling contact with the grooves of the first and third rollers.

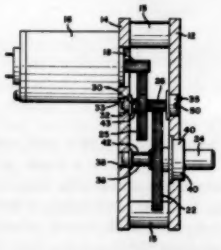
---

4,147,071

## LOW BACKLASH GEAR REDUCTION ASSEMBLY

Jack B. Scribner; Edward W. Moorman, and James S. Payne, all of Dayton, Ohio, assignors to TRW Inc., Cleveland, Ohio

Filed Feb. 1, 1978, Ser. No. 874,109
Int. Cl.[2] F16H 55/18, 1/12; B23C 9/00
U.S. Cl. 74—409 4 Claims



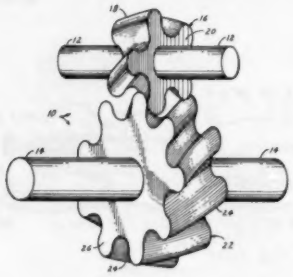
1. In a reduction gear assembly in which a pinion gear drives a gear-pinion cluster mounted on a shaft which in turn drives a bull gear, the improvement in backlash control comprising means mounting one end of said shaft for eccentric adjustment at the pinion end thereof only in a motion toward and away from intermesh with said bull gear.

4,147,072

## COMPATIBLE ANGLED GEAR SYSTEM

Max Mullins, c/o Mrs. Nel Mullins, 13700 NE. Miami Ct., Miami, Fla. 33161

Filed Sep. 12, 1977, Ser. No. 832,435
Int. Cl.[2] F16H *1/12, 55/06*
U.S. Cl. 74—416 4 Claims



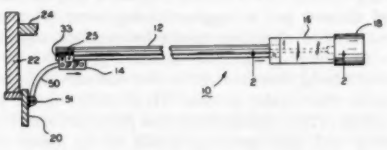
1. A compatible angled gear system (10) comprising two gear shafts (12, 14), at an angle to each other, the angle of the two gear shafts to each other ranging between maximum of ninety degrees to a minimum of forty-five degrees, the limit of angle of the gear teeth (18, 24) to the gear face ranging from a corresponding maximum of forty-five degrees to a minimum of twenty-two and one-half degrees to the gear face, there being an odd number of gear teeth on each gear with a minimum of five teeth on each gear, the angle of the shafts always being exactly twice the angle of the gear teeth.

4,147,073

## GARAGE DOOR OPENER

Carl Mercier, 36909 Lisbon Rd., Oconomowoc, Wis. 53066

Filed Jul. 1, 1977, Ser. No. 812,165
Int. Cl.[2] F16H *1/18*
U.S. Cl. 74—424.8 R 7 Claims



1. A door opener including elongate rod means having a major thread formed thereon,

reversible motor means coupled to said rod for reversibly rotating said rod means about its longitudinal axis,

carrier means adapted to be coupled to a door and cooperating with said major thread for longitudinal movement between first and second positions relative to said rod means in response to rotation thereof,

a pair of spaced apart switch means disposed adjacent a portion of said rod means, the distance between said switch means being substantially shorter than that between said first and second positions,

a second thread formed on at least that portion of said rod means between the positions of said switch means,

a threaded switch activating member mounted on said rod means and engaging the second thread thereof for movement between said switch means in response to rotation of said rod means,

means coupling said switch means to said motor means whereby activation of said switch means controls the energization of said motor,

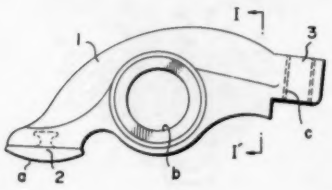
the pitch of said major thread being substantially greater than that of said second thread whereby said carrier means is moved by said motor means between its first and second positions as said actuating member travels between said switch means.

4,147,074

## ALUMINUM ALLOY ROCKER-ARM

Masamitsu Noguchi, Toyota; Yoshiro Komiyama, Okazaki, and Masaoki Hashimoto, Aichi, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed May 23, 1977, Ser. No. 799,688
Claims priority, application Japan, Feb. 5, 1977, 52-012021
Int. Cl.[2] G05G *11/00*
U.S. Cl. 74—559 10 Claims



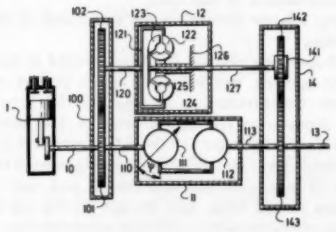
1. A rocker-arm body of a high strength aluminum alloy and comprising, an integrally connected wear resistant material pad at one end of the rocker-arm body; a threaded adjusting screw receiving opening formed in the aluminum alloy at the other end of the body; the sectional profile of the arm being T or inverted T-shaped; said aluminum alloy consisting essentially of by weight Si 5–25%, Cu in an amount sufficient to add strength to the alloy but less than about 6%, Mg in an amount sufficient to permit heat strengthening of the alloy but less than about 1.5%, P 0%–0.2% and the balance Al.

4,147,075

## COMBINED GEARBOX WITH STEPLESS VARIABLE SPEED RATIO

Stefan Rasman; Pavol Hegedus, and Pavol Habarda, all of Martin, Czechoslovakia, assignors to Turcianske Strojarne, Martin, Czechoslovakia

Filed Jul. 14, 1977, Ser. No. 815,711
Int. Cl.[2] F16H *47/00, 37/06*
U.S. Cl. 74—720 3 Claims



1. A combination gear box having a stepless variable speed ratio comprising:

an input driving member;

a first gearbox comprising a variable-speed conversion driving unit having input and output shafts and exhibiting a controlled variation speed ratio between said shafts;

a second gearbox comprising a hydrodynamic drive and having input and output shafts and containing a hydrodynamic torque converter;

means connecting said input driving member to both of said input shafts;

a disconnecting clutch coupled between said output shafts;

an output driven member; and

means for connecting the output driven member to both said output shafts that are coupled via said disconnecting clutch.

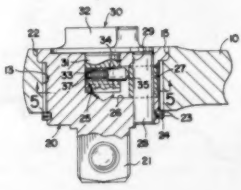
---

4,147,076

## REVERSING-RATCHET SOCKET WRENCH

Richard B. Wright, Akron, and Ronald D. Konieczynski, North Royalton, both of Ohio, assignors to The Wright Tool and Forge Company, Barberton, Ohio

Filed Oct. 31, 1977, Ser. No. 847,153
Int. Cl.[2] B25B 13/46
U.S. Cl. 81—63.2 1 Claim



1. In a reversing-ratchet socket wrench including a lever with a handle at one end and a circular opening in the other end defining internal ratchet teeth about the axis of turn of said wrench, a generally cylindrical pawl carrier received in said circular opening for rotation relative to said lever about said axis of turn of said wrench, said pawl carrier also having a central axis bore and a laterally extending slot cut in the side thereof facing said ratchet teeth and communicating with said bore and a double pawl mounted in said slot for pivotal movement about a pivot axis parallel to and spaced from said axis of turn between forward and reverse drive engagement with said ratchet teeth, the improvement which comprises:

a pivotable selector means received in said pawl carrier for pivotal movement about said axis of turn, for switching said double pawl element between its forward drive and reverse drive engagement with said ratchet teeth said selector means including:

a central hub portion received in said central bore and having a transverse opening at the lower end thereof, said opening being open at one end and communicating with said slot, and being closed at the other end by the interior surface of said bore,

a rotary selector button on the upper end of said hub portion,

a pawl-operating plunger slidably received in said transverse opening, and having a length greater than the depth of said transverse opening, and thus greater than the diameter of said central bore so that interference between said plunger and the side of said bore keeps the forward end of said plunger extending beyond the diameter of said bore into said slot to lock said selector means in said bore, said plunger having an enlarged forward portion with a diameter approximately equal to the diameter of said transverse opening and a rearward portion of smaller diameter being engageable with said double pawl for pivoting said pawl in response to manual switching of said selector means between said forward drive and reverse drive engagement with said ratchet teeth, said plunger being slidable in said opening between an extended position and a retracted position to permit ratcheting of said wrench, and

a helical spring located in said transverse opening surrounding said rearward portion of said plunger and bearing between the interior surface of said bore and said forward portion of said plunger to urge said plunger toward said extended position.

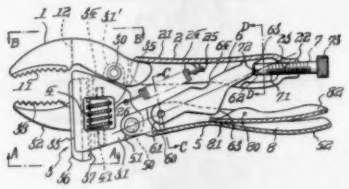
---

4,147,077

## ADJUSTABLE LOCKING WRENCH

Noboru Tasato, 57 Asato, Naha, Okinawa, Japan

Filed Oct. 25, 1977, Ser. No. 845,324
Claims priority, application Japan, Nov. 2, 1976, 51-131225
Int. Cl.[2] B25B 7/12
U.S. Cl. 81—367 2 Claims



1. A locking wrench of the type including a body member (2) formed integral with a stationary jaw (1), movable jaw unit (3) pivotally secured to said stationary jaw at a point adjacent to the basal end thereof by means of a first pivot (30), an operating handle (5) pivotally secured at the basal end (51) thereof to said movable jaw unit by means of a seond pivot (50) provided thereon at a point to define a triangle together with said first pivot and the grip face of said movable jaw unit, a third pivot (60) provided on said operating handle at a point adjacent to said second pivot (50), an adjusting bolt (7) threadably fitted to the grip end of said body member, a toggle link (6) of a predetermined length pivotally mounted at the operating end (61) thereof on said third pivot (60) and abutting at the other end (62) against the inner end of said adjusting bolt, said toggle link being formed with a lateral projection (63) intermediate the end thereof, and a toggle-releasing lever (8) pivotally mounted on said operating handle for pressure engagement with said lateral projection (63) on said toggle link, said locking wrench being characterized in that said movable jaw unit (3) consists of a rockable member (31) pivotally secured to said body member (2) by means of said first pivot (30) and pivotally connected with said operating handle (5) by means of said second pivot (50), an adjustable jaw member (32) supported on said rockable member for movement relative thereto, and gap-adjusting means (4) provided on said rockable member for moving said adjustable jaw member (32) toward and away from said stationary jaw (1); and

said rockable member (31) being provided with a forward edge (33) extending in a plane intersecting said stationary jaw at a point adjacent to the inner end of the grip face (11) thereof substantially at right angles to the grip face in the normal state of the locking wrench, a guide groove (34) formed in said forward edge (33) lengthwise thereof and having a cylindrical enlarged bottom, and a window opening (35) extending through said rockable member transversely thereof and communicating with said guide groove (34), said adjustable jaw member (32) having a sliding portion (36) formed with a cylindrical enlarged edge extending substantially at right angles to the grip face (38) of said adjustable jaw member and slidably fitted in said guide groove (34), rack teeth (37) formed on said cylindrical enlarged edge and presenting themselves into said window opening (35), and a worm (40) rotatably supported in said window opening (35) in meshing engagement with said rack teeth.

## 4,147,078
## TREATMENT OF WEB MATERIAL

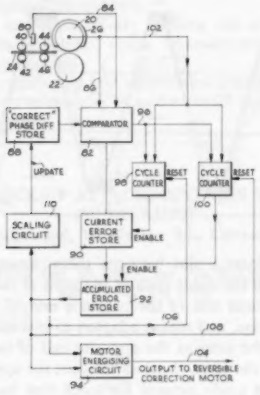
**Thomas D. Bishop, Birmingham, England, assignor to The Deritend Engineering Company Limited, Birmingham, England**

**Filed Dec. 8, 1977, Ser. No. 858,748**

**Claims priority, application United Kingdom, Dec. 14, 1976, 52447/76**

**Int. Cl.[2] B26H *17/08***

**U.S. Cl. 83—74** **10 Claims**




1. Apparatus for treating web material bearing a series of pre-treated areas, said apparatus comprising a pair of rotatably driven treatment rolls including one roll having a treatment area which extends over part of its circumference and is generally co-extensive with one or more of said pretreated areas, said treatment area, when in confronting relation with the other roll of the pair, providing a nip by means of which the web is driven forwardly while it is contacted by the treatment area, an adjustable feed mechanism located adjacent the entering side of the roll pair, said feed mechanism constituting means for decelerating the web upon cessation of contact between the web and said treatment area, moving the web in the reverse direction, and then accelerating it in the forward direction to synchronize the web speed with the linear speed of the treatment area whereby, for a certain adjustment of the feed mechanism setting, the web is advanced forwardly, during the time between cessation of contact and renewed contact with the treatment area, by a standard length increment which, in the absence of any mis-registration between said treament area and the pretreated web area, maintains registration therebetween, characterised by: means for determining the mis-registration, if any, that occurs between said treatment area and said pre-treated web areas over one or more cycles of operation of the apparatus, and means responsive to the mis-registration-determining means and operable to temporarily adjust the feed mechanism setting during a following cycle of operation such that the web length advanced by the feed mechanism is varied to compensate for the mis-registration present, the feed mechanism thereafter being restored to its original setting.

---

## 4,147,079
## APPARATUS FOR HANDLING STRIP

**Josef Ihle, Pforzheim, Fed. Rep. of Germany, assignor to Irma Ungerer Geb. Dollinger, Pforzheim, Fed. Rep. of Germany**

**Filed May 9, 1977, Ser. No. 795,155**

**Claims priority, application Fed. Rep. of Germany, Oct. 13, 1976, 2646200**

**Int. Cl.[2] D21H *1/14***

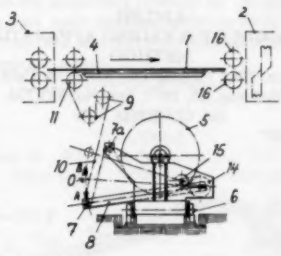
**U.S. Cl. 83—170** **19 Claims**

1. Apparatus for continuously handling first and second strips in contact with each other, comprising

first feeding means for delivering said first strip at a controlled velocity,

second feeding means for receiving said first strip from said first feeding means and for intermittently pulling and delivering said first and second strips in contact with each other,

looping means for engaging said first strip between said first and second feeding means and for urging said strip to form a loop, sensing means for indicating the length of said loop,



a looping roller arranged to engage said first strip between said first and second feeding means and to urge said first strip to form a loop,

a lever carrying said looping roller and arranged to perform an angular movement in response to a change of the length of said loop, and

control means for controlling the velocity at which said first strip is delivered by said first feeding means in response to said lever, in inverse relation to the length of said loop, said first feeding means comprising a drive motor and said control means being adapted to accelerate and brake said motor in response to said lever.

---

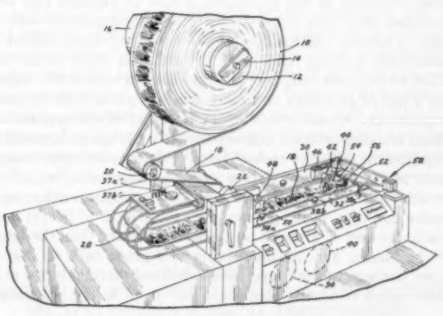
## 4,147,080
## MULTICHANNEL INDICIA SENSOR FOR AUTOMATIC PHOTOGRAPHIC PAPER CUTTER

**Robert E. Diesch, Rogers, and Gerald R. Strunc, Maple Grove, both of Minn., assignors to Pako Corporation, Minneapolis, Minn.**

**Filed Sep. 29, 1977, Ser. No. 837,986**

**Int. Cl.[2] B26D *5/38***

**U.S. Cl. 83—371** **18 Claims**



1. In a photographic paper cutter for cutting photographic prints from a strip of photographic paper which bears indicia for indicating desired cut locations, an improved system for sensing the indicia and controlling the operation of the photographic paper cutter, the improved system comprising:

an array of indicia sensors, each positioned to sense indicia on a different portion of the photographic paper and to produce output signals in response to sensed indicia;

paper feed oscillating means for feeding photographic paper bearing indicia back and fourth past the array of indicia sensors;

select means for selecting one of the array of indicia sensors which provides an acceptable output signal when the photographic paper is fed back and forth past the plurality of indicia sensors; and

control means for controlling operation of the photographic paper cutter in response to output signals from the indicia sensor selected by the select means.

---

**4,147,081**

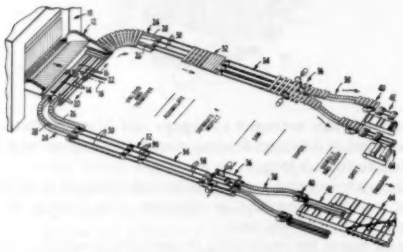
## PASTA NOODLE PACKAGING APPARATUS AND METHOD

**Roy C. Pellaton, 2308 Virginia La., Stockton, Calif. 95204**

**Filed Aug. 25, 1977, Ser. No. 827,736**

**Int. Cl.[2] B26D** *7/06*

**U.S. Cl. 83—407** **15 Claims**



15. An improved sawing apparatus for handling, in rapid succession, elongate pasta noodle blanks folded upon themselves in a generally U-shaped configuration, said apparatus comprising: a continuous horizontally disposed conveyor adapted to receive the pasta blanks in transversely extending orientation relative thereto and move said blanks through the apparatus in a direction normal to the elongate dimension of the blanks; a closed loop weighting chain disposed above said conveyor, said chain being supported between a pair of sprockets mounted above the conveyor for rotation about axes extending normal to the direction of travel of the conveyor and having a lower reach of sufficient length to permit said reach to sag down relative to the sprockets and engage noodles on the conveyor; means to drive said weighting chain so that so that the lower reach thereof moves at the same speed and in the same direction as the conveyor; a pair of circular end saws mounted above the conveyor for sawing engagement with the ends of noodle blanks supported on the conveyor; means for selectively moving said saws toward and away from each other to vary the length of the noodles cut within the apparatus; a pair of generally vertically disposed guide belts mounted, respectively, to either side of the lead end of the apparatus to direct noodles onto the conveyor, said belts being disposed for engagement with the ends of noodle blanks conveyed to apparatus and converging relative to one another to define a flared mouth longitudinally aligned with the conveyor and having an intake end of a width greater than the length of blanks and a discharge end of a width only slightly greater than the length of the blanks; and, means driving said guide belts so that the inner surfaces of the flared mouth defined thereby move at the same speed as noodle blanks are conveyed to the apparatus.

---

**4,147,082**

## ADJUSTABLE STOCK GUIDE

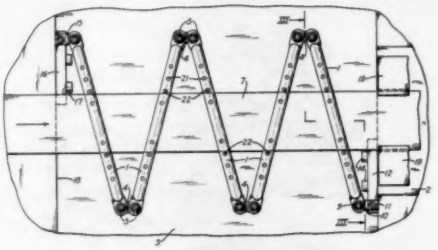
**John C. Vecchi, 1603 Third St., Natrona Heights, Pa. 15065**

**Filed Mar. 17, 1978, Ser. No. 887,674**

**Int. Cl.[2] B65H** *5/38*

**U.S. Cl. 83—440.1** **7 Claims**

1. A longitudinally adjustable stock guide for installation between the entrance end of the bottom die support of a stamping or punch press and the adjacent end of the press, said guide comprising upper and lower rows of substantially horizontal rigid arms, means pivotally connecting the arms in each row end to end on vertical axes with the arms extending back and forth in a zigzag configuration to thereby permit the length of the rows to be increased and decreased, each arm in the lower row being directly below an arm in the upper row and spaced



therefrom to form a slot between them, means adapted to pivotally attach the outer ends of the arms at one end of said rows on a vertical axis to the entrance end of a bottom die support in a press, and means adapted to pivotally attach the outer ends of the arms at the opposite end of said rows on a vertical axis to the press, the slots between the upper and lower arms forming a guide passage for stock that has entered the press.

---

**4,147,083**

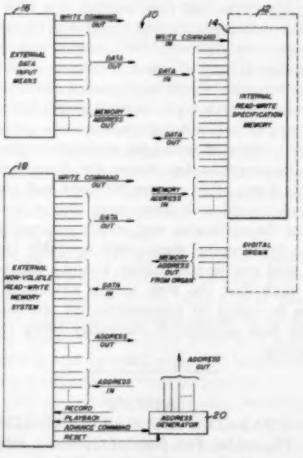
## PROGRAMMABLE VOICE CHARACTERISTIC MEMORY SYSTEM

**Robert P. Woron, Allentown; J. Thomas Whitefield, Harleysville, and Steven R. Roth, Macungie, all of Pa., assignors to Allen Organ Company, Macungie, Pa.**

**Filed Dec. 16, 1976, Ser. No. 751,246**

**Int. Cl.[2] G10H** *1/00*

**U.S. Cl. 84—1.01** **12 Claims**




1. In an electronic digital organ in which digital information is used to define voice characteristics, a programmable voice characteristic memory system comprising:

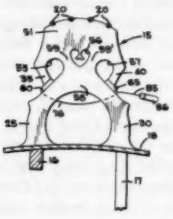
an internal read-write specification memory for storage of voice characteristic information representative of a plurality of voices,

an external, non-volatile read-write memory for storing

voice characteristic information representative of a plurality of voices,
external data input means for selectively providing voice characteristic information representative of a plurality of voices,
means for writing into said internal read-write memory voice characteristic information from said external data input means,
means for writing into said internal read-write memory voice characteristic information from said external, non-volatile read-write memory,
means for non-destructively reading out of said internal read-write memory voice characteristic information stored therein, and
means for transferring said information read from said internal read-write memory to said external non-volatile read-write memory.

---

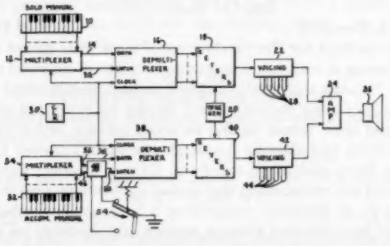
**4,147,084**
**SOUND PICK-UP ATTACHMENT FOR STRINGED INSTRUMENT**
**Donald E. Underwood, W. Garzas Rd., Carmel Valley, Calif. 93924**
**Filed Jun. 30, 1977, Ser. No. 811,602**
**Int. Cl.[2] G10H *3/02***
**U.S. Cl. 84—1.16** **13 Claims**



1. In combination:
a stringed instrument comprising:
(a) a sounding board to provide a resonator; and
(b) a bridge comprising a first leg projecting from said sounding board and a first wing confronting said first leg in spaced relation for producing vibrating motions; and
(c) a first sound pick-up device disposed between said first leg and said first wing to detect the vibratory motions produced therefrom.

---

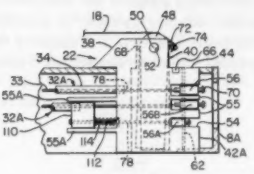
**4,147,085**
**ELECTRONIC ORGAN HAVING MEMORY CIRCUIT**
**John W. Robinson, and Stephen L. Howell, both of Jasper, Ind., assignors to Kimball International, Inc., Jasper, Ind.**
**Filed Jun. 10, 1977, Ser. No. 805,329**
**Int. Cl.[2] G10H *1/00, 5/00***
**U.S. Cl. 84—1.17** **20 Claims**



1. In an electronic organ having a pair of keyboard sections each having playing keys, multiplexer means repetitively scanning the playing keys of at least one of said sections and demultiplexer means connected to receive the data supplied by said multiplexer means, said demultiplexer means comprising latches which control the production of tones from the organ in conformity with the depression of the playing keys of said one section of the keyboard, said multiplexer means supplying a latch updating pulse to said latches at the end of each scanning cycle thereof, the improvement comprising control means interposed between said multiplexer means and said demultiplexer means and selectively operable by the organ player for interrupting said latch updating pulse so as to interrupt the updating of the data supplied from said multiplexer means to said demultiplexer means.

---

**4,147,086**
**GUITAR**
**Roy L. Cough, Jr., P.O. Box 704, Concord, N.H. 03301**
**Filed Sep. 1, 1977, Ser. No. 829,630**
**Int. Cl.[2] G10D *3/14***
**U.S. Cl. 84—312 P** **28 Claims**



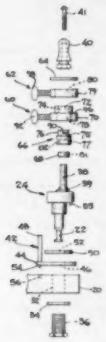
1. A guitar comprising a plurality of strings each having a first end and a second end, means for securing said first string ends to a fixed support, and end means for securing said second string ends to a fixed support, said end means comprising pitch changer means for adjusting the tension of at least two of said strings so as to vary the string pitch of said at least two strings, said pitch changer means comprising a base block, at least two fingers each having an upper end and a lower end, an axle pivotally securing the upper end of said fingers to said base block so that said fingers are spaced from one another, means securing said at least two strings to said at least two fingers so that the tension on said strings will vary according to the positions of said fingers, at least one elongate pitch bar mounted for movement relative to said base block toward and away from said fingers, adjustable means carried by said at least one pitch bar for directly applying a force to at least one of said fingers and moving said at least one finger in a direction to alter the string tension of any string which is secured on said finger when said at least one pitch bar is moved in a selected direction, a flexible cable attached to each of said at least one pitch bars having one end extending between said at least two fingers and attached to said pitch bar, and operating means for exerting a pull on said at least one cable so as to cause said cable to move said at least one pitch bar in said selected direction.

---

**4,147,087**
**PITCH CHANGE LIMITING DEVICE IN CONJUNCTION WITH STRINGED MUSICAL INSTRUMENTS**
**Joseph Peters, Jr., 2509 179th St., Torrance, Calif. 90504, and Brian P. Feeney, 11820 Woodbine Ave., Los Angeles, Calif. 90066**
**Filed Jun. 13, 1977, Ser. No. 806,093**
**Int. Cl.[2] G10D *3/14***
**U.S. Cl. 84—312 R** **2 Claims**

1. In a tuning key for stringed musical instruments in combination, an instrument body, a tuning key peg having a shaft rotatably mounted on said instrument body, said tuning key

head also having an enlarged head with a protrusion thereon normally adapted to engage body and having a plate and an outwardly extending limit stop element, a protrusion on a surface of said limit stop plate to engage said instrument body and lock said limit plate to said instrument body to prevent rotational movement of said limit stop means with respect to said instrument body, a flexible washer located between said enlarged head and said limit stop plate and having a resilient surface to receive the protrusion on said enlarged head to thereby lock said tuning key to said limit stop means, an adapter cylinder provided for rigid mounting on the rotatable shaft of said tuning key when said shaft has a particular one of certain cross-sectional shapes and which can be omitted when said shaft has another cross-sectional shape, said adapter cylinder having a first cylindrical body section and a second cylindrical body section of reduced diameter joined to extending from said first cylindrical body section, annular shoulder means on said first cylindrical body section surrounding said second cylindrical body section at the joinder of said two body sections, an upper ring provided for rotatable disposition on said adapter cylinder and having a thumb screw to lock said upper ring to said adapter cylinder and contact said limit stop, said upper ring also being adapted for rotatable disposition on said shaft when said adapter cylinder is omitted, said upper ring having a ring portion with a first aperture to receive said first body section and a diametrally reduced extension with a



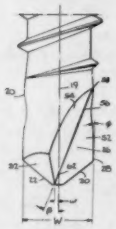
second diametrally reduced aperture to receive said second body section, a shoulder on said upper ring formed between said ring portion and said diametrally reduced extension, said first aperture having a size and shape approximately equal to the size and shape of first cylindrical body section and said second aperture having a size and shape approximately equal to the size and shape of said second body section, said adapter cylinder and upper ring having substantially the same axial dimension, and a lower ring rotatably mounted on said diametrally reduced extension of said upper ring and having a thumb screw to lock said lower ring to said upper ring and contact said limit stop, said upper ring having a first end on said ring portion and an opposite second end on said diametrally reduced extension, said adapter cylinder having a first end on said first cylindrical body section and a second opposite end on said second cylindrical body section and said adapter cylinder having a recess in the first body section and at the first end thereof, said upper ring and adapter cylinder having substantially the same axial dimension, said lower ring having a first end engageable with the shoulder on said upper ring and having a second end, the second ends of said upper and lower rings and adapter cylinder being generally flush and the first ends of said adapter cylinder and upper ring being generally flush when in the assembled relationship, and insert means provided for removable insertion into said recess to accommodate a tuning key peg without a neck portion thereon.

**4,147,088**

## DRILL SCREW

**Charles B. Whittaker, Jr., Statesville, N.C., assignor to NL Industries, Inc., Hightstown, N.J.**

**Filed Mar. 16, 1977, Ser. No. 778,149**
**Int. Cl.[2] F16B *25/00***
**U.S. Cl. 85—41** **10 Claims**



**1.** A drill screw comprising an elongated element having a threaded central region, a driving head at one end of said element for receiving a turning and driving tool and a drill bit formation at the opposite end of said element for drilling a hole into which said element becomes threaded, said threaded central region, said driving head and said drill bit formation extending along a common longitudinal axis, said drill bit formation comprising a shank portion extending axially out from said opposite end of said element and a flank portion extending axially out from said shank portion, flute means formed in diagonally opposed quadrants of said shank and flank portions and extending longitudinally thereof, each of said flute means having a cutting edge surface and a drag edge surface which extend inwardly from the peripheral surfaces of said shank and flank portions to define diagonally opposed lands of circular cross-section interposed between said flutes, each said circular cross-section having a radius greater than the radius of said threaded central region, the intersection between the cutting edge surface of each flute with the peripheral surface of its associated shank and flank portion forming cutting edges, the center of curvature of each land cross-section along said shank portion being displaced from, but located along a line passing through, said longitudinal axis and extending transversely of another line between said edges, said cutting edges, at each cross-section of said drill bit formation, being located at a greater radial distance from said common longitudinal axis than any other point at said cross-section and the other periphery of the shank portion at each cross-section intersecting its associated cutting edge surface at an acute angle.

---

**4,147,089**

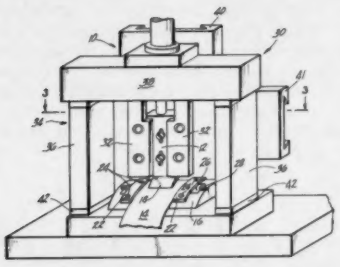
## METHOD FOR THE PRODUCTION OF MULTIPLE GAUGE STRIP BY DRAW SHAVING

**Joseph Winter, New Haven; Eugene Shapiro, Hamden, and Warren F. Smith, Branford, all of Conn., assignors to Olin Corporation, New Haven, Conn.**

**Filed Sep. 1, 1977, Ser. No. 829,907**
**Int. Cl.[2] B23D *1/00***
**U.S. Cl. 90—24 R** **9 Claims**

**1.** A method for the production of a multiple gauge metal strip having at least two longitudinal regions of different thicknesses forming a generally stepped surface, said method comprising providing shaving means having an elongated cutting edge and anvil means having an arced surface, adjusting and maintaining said shaving means at a position opposed to and spaced from said anvil means to form a shaving gap, said adjusting and maintaining step including fastening said shaving means to an assembly comprising a horizontal member and vertical legs attached thereto, seating said assembly on gauge blocks of selected height, maintaining the assembly at the desired shaving gap by the application of downward pressure

on said assembly and drawing a metal strip through said gap in contact with said shaving means and said arced surface,



thereby shaving said strip to form a multiple gauge metal strip product.

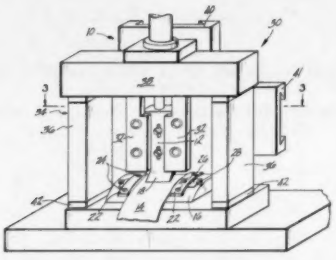
---

**4,147,090**

## APPARATUS FOR SUPPORTING A SHAVING TOOL IN AN ADJUSTABLE TOOL HOLDER FOR MULTIPLE GAUGE STRIP DRAW SHAVING

**Joseph Winter, New Haven; Eugene Shapiro, Hamden, and Warren F. Smith, Branford, all of Conn., assignors to Olin Corporation, New Haven, Conn.**

**Filed Sep. 1, 1977, Ser. No. 829,908**
**Int. Cl.[2] B23D *1/00***
**U.S. Cl. 90—24 R** **9 Claims**



1. Apparatus for the production of multigauge strip material comprising a tool holder assembly, said tool holder assembly including a horizontal member having speed vertical legs depending therefrom, a shaving tool having an elongated cutting edge, said shaving tool being located between said legs and being supported by said tool holder assembly, a base, an anvil having an arced surface supported on said base, said tool holder assembly being supported on said base and said shaving tool being located opposed to and adjacent the arced surface of said anvil, means for vertically adjusting and maintaining said tool holder assembly at a predetermined height to provide a desired shaving gap between the cutting edge of said shaving tool and the arced surface of said anvil, whereby a predetermined gauge of metal strip can be shaved from a thicker strip drawn between the anvil and the shaving tool.

---

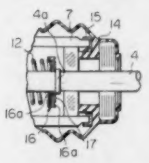
**4,147,091**

## FLUID PRESSURE SERVOMOTOR

**Yoshihiro Hayashida, Chigasaki, Japan, assignor to Tokico Ltd., Kawasaki, Japan**

**Filed Sep. 16, 1977, Ser. No. 834,051**
**Claims priority, application Japan, Sep. 20, 1976, 51-126438**
**Int. Cl.[2] F15B *9/10***
**U.S. Cl. 91—376 R** **3 Claims**

1. In a fluid pressure servomotor having a casing with a movable wall therein dividing the interior of the casing into two chambers, a valve body connected to the movable wall and having a valve mechanism which communicates one of the chambers selectively with the other chamber or with a source of fluid pressure such as atmospheric pressure, an input rod mounted in the valve body to operate the valve mechanism, and a spring urging the input rod outwardly of the valve body, the improvement comprising a flange portion on the input rod, an annular spring retaining member around said input rod with



said spring abutting the surface on one side thereof and the inner diameter of which is larger than the outer diameter of the flange portion of the input rod and having a circumferentially extending projection projecting from the surface on the other side of the retaining member, and a stop ring fitted onto the input rod and positioned between the flange portion of the input rod and the surface on the other side of the retaining member with the outer circumference thereof fitted in the inner circumference of said projection.

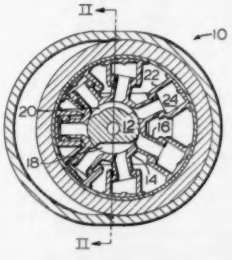
---

**4,147,092**

## SELF-FILLING FLUID DEVICE

**William K. Engel, Peoria, and Robert C. Hansen, East Peoria, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.**

**Filed Feb. 28, 1977, Ser. No. 773,045**
**Int. Cl.[2] F01B *13/04***
**U.S. Cl. 91—490** **11 Claims**



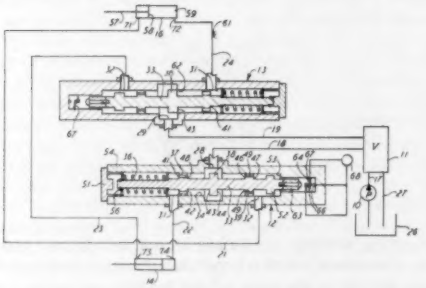
1. In a fluid device having a first portion defining an inlet and a second portion defining at least one pumping chamber, said chamber being positioned in spaced relation to said inlet for receiving fluid therefrom and being rotatably movable relative to said inlet in a preselected direction at a preselected speed, the improvement comprising:

means, positioned in said pumping chamber adjacent the inlet at a preselected angle, for contacting fluid at the inlet and imparting energy thereto which is substantially perpendicular to the means and forcibly moving the fluid from the inlet and accelerating said fluid radially into said pumping chamber in response to rotation of said means with said chamber.

## 4,147,093
## SELF-ACTUATING FLUID HOLDING SYSTEM

Donnell L. Dunn, Terre Haute, Ind., assignor to J. I. Case Company, Racine, Wis.

Filed Mar. 4, 1977, Ser. No. 774,235
Int. Cl.[2] F15B *11/00, 13/00*
U.S. Cl. 91—510 4 Claims



1. A self-actuating fluid holding system, comprising a fluid pump and two fluid valves and two fluid motors all fluid-flow connected together and arranged to direct fluid through said valves and to and from said motors, said valves and said motors each having two fluid connections for entry and exit of fluid to and from said valves and said motors and with each of said motors having two different fluid-flow capacities and with each flow capacity being respectively proportional to each other and respectively proportional to said two fluid connections in a given proportion, said valves each having two fluid ports in fluid-flow connection with the respective said two fluid connections of said valves and with said ports being of fluid flow-through sizes in respective proportion to the said capacities of said motors, said valves each having one additional fluid connection in fluid-flow connection with said pump, said valves each having a movable valve spool operative on said two fluid ports for controlling fluid-flow communication between said fluid connections and said two fluid ports in accordance with fluid forces applied to said valve spools, said spools having a fluid sealing projection to stop fluid-flow from said pump to one of said two fluid ports, said spools each having two pairs of axially-faced surfaces exposed to fluid pressure intermediate said two fluid ports and with each of said surfaces having fluid passageways extending therethrough and in flow capacity in respective proportion to the said proportions in said two fluid ports in said valves for axial shifting of said spools in response to differential fluid pressures at said surfaces, a spring in abutment with each of said spools for centering said spools to a position with said sealing projection free from stopping flow to said two fluid ports, and said two fluid ports in each of said valves being of different fluid-flow sizes, and the first-mentioned said two fluid connections respectively fluid-flow connected between said two fluid ports and said motors in relation to said capacities of said motors, such that said valve spools are forced to closed positions when fluid flow in the first-mentioned said two fluid connections is different from said given proportion.

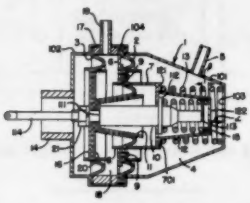
---

## 4,147,094
## VACUUM OPERATED DEVICE

Masaru Iguchi, Katsuta, Japan, assignor to Hitachi, Ltd., Japan

Filed Jan. 28, 1977, Ser. No. 763,694
Claims priority, application Japan, Jan. 28, 1976, 51-7508
Int. Cl.[2] F01B *19/00*
U.S. Cl. 92—48 5 Claims

1. A vacuum operated device comprising a casing, a first diaphragm disposed in and at its periphery secured to the casing and defining these with a first vacuum chamber which has a pipe communicating with a vacuum source, a second diaphragm disposed in the casing with a spaced distance between the first and second diaphragms, its periphery fixed to the casing and defining a second vacuum chamber between itself and the first diaphragm which has a pipe communicated with the vacuum source through a changeover valve, a rod communicated with the vacuum source through a changeover valve, a rod connected to both centers of the first and second diaphragms, said rod being connected to an output means extending outside said casing, a driving member disposed in the first vacuum chamber and connected to the first diaphragm



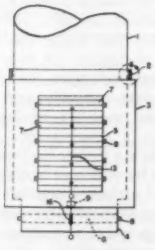
between the center and the periphery thereof, said driving member for causing movement of the rod, a spring receiving box contacting the driving member, a first spring disposed between the casing and the spring receiving box and pressing the spring receiving box into contact with the driving member, a second spring contained in the spring receiving box and pressing a flange of the rod into engagement with the driving member, and a stopper disposed in and connected to the casing for restraining movement of the first diaphragm by the first spring acting on the spring receiving box and the driving member.

---

## 4,147,095
## DIRECTIONAL CONCENTRATED AIR DISCHARGE OUTLET

John D. Jacobs, 2708 Merrimac Cir., Waco, Tex. 76710

Filed Apr. 20, 1977, Ser. No. 788,994
Int. Cl.[2] F24F *13/14*
U.S. Cl. 98—40 VM 7 Claims



1. An air discharge device for use with an air supply system comprising:

an outlet box,

first and second outlet openings in said outlet box spaced from one another and at a predetermined angle approximately 90° to one another,

first and second adjustable air directing means positioned respectively in said first and second outlet openings, each of said air directing means being operable to direct a stream of air issuing therefrom in a selected direction, said first and second air directing means being so oriented with respect to one another that the streams of air issuing therefrom are focused upon a selected area, and

control means connected to both said first and second air directing means for conjointly adjusting said air directing means for altering the direction of flow of the airstreams

issuing therefrom, said control means maintaining a fixed relationship between said first and second air directing means so that the airstreams issuing therefrom both continue to be directed toward a selected area.

7. An air discharge device for use with an air supply system comprising;

an outlet box having means for rotatably securing it to be rotatable with respect to the air supply system through 360° of rotation,

first and second outlet openings in said outlet box spaced from one another and disposed at a predetermined angle to one another,

first and second adjustable air directing means positioned respectively in said first and second outlet openings,

each of said air directing means being operable to direct a stream of air issuing therefrom in a selected direction,

said first and second air directing means being so oriented with respect to one another that the streams of air issuing therefrom are focused upon a selected area, and

control means connected to both said first and second air directing means for conjointly adjusting said air directing means for altering the direction of flow of the air streams issuing therefrom, said control means maintaining a fixed relationship between said first and second air directing means so that the air streams issuing therefrom both continue to be directed toward a selected area.

---

**4,147,096**

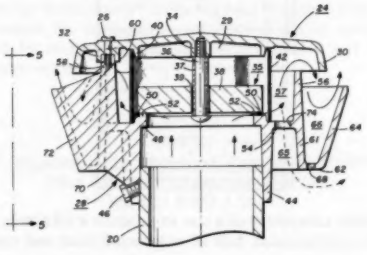
## BREATHER VENT FOR VAPOR VENT VALVE

**Richard L. Caswell, Salisbury, Md., assignor to Dresser Industries, Inc., Dallas, Tex.**

**Filed Jun. 1, 1977, Ser. No. 802,394**

**Int. Cl.**[2] **F23L** *17/02;* **F16K** *15/00, 24/00;* **F16L** *55/07*

**U.S. Cl. 98—122** **11 Claims**



1. A breather vent for weather exposed mounting over an upstanding vapor vent pipe from which noxious vapors are to be expelled, said breather vent comprising in combination:

(a) a hollow body adapted for position mounting over the vent pipe outlet;

(b) first wall means in said body defining a primary flow path between an inlet adapted to communicate with the vent pipe on which said body is mounted and a primary substantially continuous peripheral outlet oriented for noxious vapor received at the primary flow path inlet to discharge to atmosphere in an upwardly direction;

(c) first weather shielding means on said body extending over said primary outlet for effecting a degree of weather shielding thereof;

(d) second wall means in said body defining a secondary flow path between an inlet adapted to communicate with the vent pipe on which said body is mounted and a secondary outlet oriented for noxious vapor received at the secondary flow path inlet to discharge to atmosphere in a downwardly direction;

(e) second weather shielding means on said body extending over said secondary outlet for effecting a degree of weather shielding thereof relatively greater than afforded said primary outlet by said first weather shielding means; and

(f) support means for supporting a vapor vent valve at an intermediate location in each of said flow paths;

whereby said secondary flow path is adapted to function for discharging noxious vapors in the alternative to said primary flow path if weather caused inoperability occurs at said primary outlet.

---

**4,147,097**

## METHOD OF AND APPARATUS FOR MAKING DRIP-TYPE COFFEE

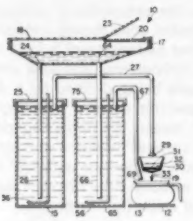
**Richard Gregg, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio**

**Division of Ser. No. 726,073, Sep. 23, 1976. This application Mar. 31, 1978, Ser. No. 892,240**

**Claims priority, application Canada, Sep. 22, 1977, 287316**

**Int. Cl.**[2] **A47J** *31/00*

**U.S. Cl. 99—283** **10 Claims**



1. A drip coffeemaker for making varying amounts of a coffee beverage from roasted and ground coffee primarily for immediate consumption, said drip coffeemaker comprising a drip brew basket-filter means for receiving a bed of roasted and ground coffee, and means for providing a predetermined quantity of heated water for drip extraction from said roast and ground coffee, which heated water passes through said bed of roast and ground coffee through an aperture in drip brew basket-filter means into a container positioned below said drip brew basket-filter means to provide a filtered coffee extract, the improvement comprising:

a. water receiving means for receiving a predetermined quantity of water;

b. means for dividing said predetermined quantity of water into an extraction portion and a bypass-dilution portion,

c. warm water means for forwarding said extraction portion of said water at a predetermined temperature over said roasted and ground coffee at a sufficiently slow rate to cause a relatively strong filtered coffee extract to issue into said container; and,

d. dilution water means for causing said bypass-dilution portion of said water to bypass said bed of roast and ground coffee and for causing said bypass-dilution portion to be forwarded into said container at a pre-selected temperature substantially different from said pre-determined temperature, said coffeemaker further comprising means for causing said bypass-dilution portion to be so related to said extraction portion of said water and said pre-selected temperature to be so related to said predetermined temperature to cause said relatively strong coffee extract to be diluted to a predetermined beverage concentration at a preferred serving temperature.

**4,147,098**

## APPARATUS FOR CONTINUOUS TREATMENT OF MATERIAL

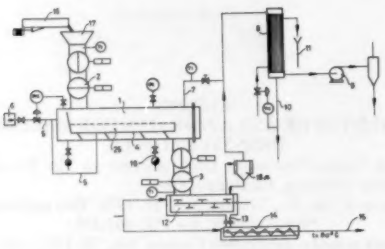
**Johan F. Witte, Amsterdam, Netherlands, assignor to Stork Amsterdam B.V., Amstelveen, Netherlands**

**Filed Feb. 25, 1977, Ser. No. 772,272**

**Claims priority, application Netherlands, Jan. 3, 1976, 7602123**

**Int. Cl.[2] A23B** *7/00*

**U.S. Cl. 99—477** **14 Claims**



1. An apparatus for continuous treatment of vegetable materials and the like whether or not under a pressure which differs considerably from the atmospheric pressure, comprising: a tightly closed treatment zone means connected with gas-tight means for discharging materials and at least one inlet means for treatment medium debouching into said treatment zone, said treatment zone means being defined by a device for treating materials having a material support with apertures for cooperation with vibrator means for imparting periodic movement having at least one vertical vibration component, said vibrator means being adapted to cooperate with said inlet means permitting said treatment medium flow through said material support during the action of said vibrator means.

---

**4,147,099**

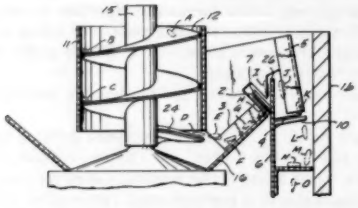
## ROOT-CROWNING APPARATUS

**Agne C. Persson, Naantali, Finland, assignor to Inmektor KY, Naantali, Finland**

**Filed Jun. 29, 1977, Ser. No. 810,987**

**Int. Cl.[2] A23N** *15/02, 15/04*

**U.S. Cl. 99—636** **7 Claims**



1. An apparatus for trimming the ends of elongate edible roots, comprising:

a carrousel forming an upwardly diverging frustoconical track centered on a generally vertical axis;

drive means for rotating said carrousel about said axis;

first guide means forming an array of substantially radial ascending channels on said carrousel for conducting a root deposited thereon, accelerated by centrifugal force, generally radially outwardly along one of said ascending channels;

first cutter means just beyond the radially outer ends of said ascending channels for trimming a leading end off an ascending root;

second guide means forming an array of substantially radial descending channels respectively aligned with said ascending channels on said carrousel beyond said first cutter means for conducting the trimmed root further outwardly along one of said descending channels, the latter being downwardly inclined with reference to said ascending channels at an angle sharp enough to let the root descend with its other end leading; and

second cutter means just beyond the radially outer ends of said descending channels for trimming said other end off the descending;

said carrousel being provided with substantially radial upright partitions between the channels of each array, said ascending channels being a set of upwardly open first troughs on said track terminating at an outer periphery thereof, said descending channels being a set of more steeply sloping second troughs open toward said axis and disposed beyond said outer periphery.

---

**4,147,100**

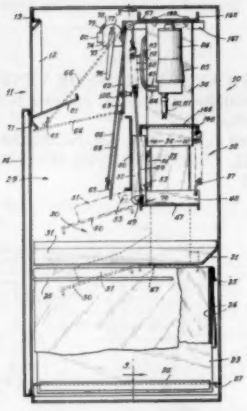
## TRASH COMPACTOR

**Donald P. Dykstra, Des Plaines, Ill., assignor to Portable Laboratories, Inc., Elk Grove Village, Ill.**

**Filed Jun. 8, 1978, Ser. No. 913,595**

**Int. Cl.[2] B30B** *15/06, 15/18*

**U.S. Cl. 100—48** **17 Claims**



1. A trash compactor of a size to produce a relatively small, manually transportable, bale of compacted trash and comprising

a housing including a frame, said housing defining a compacting chamber, a space extending upwardly from said chamber along one side of the housing and an upper opening through which trash may be inserted into the housing to descend through said space into said chamber, and

a compactor mechanism mounted within said housing and on said frame and positioned at a side of the housing in juxtaposition to said space, said mechanism including a vertically movable carriage, power means for vertically moving the carriage, a fixed platen secured to the bottom of the carriage, a movable platen articulated to the side of the carriage adjacent said space for pivotal movement from an upright position to a generally horizontal position, and actuating means connected to said movable platen for so moving said platen,

said compactor being characterized by:

said power means being connected to said actuating means to initially move said movable platen upon the activation of the power means, and

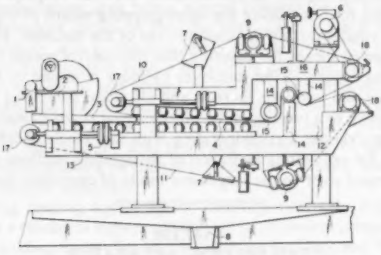
said actuating means providing a lost motion connection to said carriage to provide carriage movement only after pivotal movement of the movable platen,

whereby said movable platen serves to sweep trash from said space during descent of the carriage.

## 4,147,101
## PRESS FOR DEHYDRATING FIBROUS MATERIALS AND OTHER SUBSTANCES

**Otto Heissenberger; Rupert Syrowatka, and Ernst Tutschek, all of Graz, Austria, assignors to Maschinenfabrik Andritz Aktiengesellschaft, Austria**

**Filed May 3, 1976, Ser. No. 682,677**
**Claims priority, application Austria, May 14, 1975, 3694/75**
**Int. Cl.[2] B30B** *9/24, 5/04*
**U.S. Cl. 100—118** **1 Claim**



1. In a press for dehydrating material in which the material is passed between two endless sieve belts adapted to move in the same direction and to pass over and around at least one pair of rollers, which may be offset, and including a set of rollers forming a pre-dehdyration zone and a set of rollers forming a wedging zone,

the improvement comprising a compression zone in the form of a frame-like structure having upper and lower frame members, said upper and lower frame members containing individual compression roller means mounted on bearing blocks of varying heights,

means for horizontally displacing said bearing blocks,

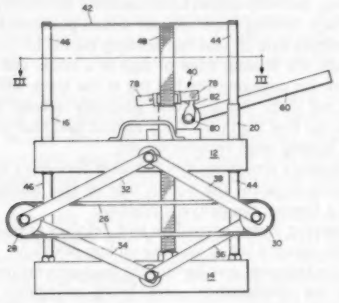
and means for exchanging said bearing blocks, whereby a path for said material is wavelike or S-shaped with surface compression.

---

## 4,147,102
## PRESS

**John W. Bigelow, 16219 Blackwood, Valinda, Calif. 91744**

**Filed Feb. 9, 1978, Ser. No. 876,368**
**Int. Cl.[2] B30B** *1/26*
**U.S. Cl. 100—257** **10 Claims**



1. A press comprising:

a fixed lower press plate;

a movable upper press plate;

a pressure clamping assembly associated with said movable upper press plate;

means for moving said upper press plate and said assembly, and for providing a stable vertical location for said upper press plate and said assembly to facilitate placing materials to be clamped beytween said plates with the plates in engagement with said material;

means for fixing the location of said pressure clamping assembly relative to said lower press plate;

means for forcing said upper press plate down with respect to said assembly; and

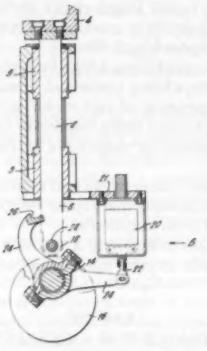
single lever means for initially actuating said fixing means and thereafter actuating said forcing means, whereby said clamping pressure assembly is first held in vertical position and then applies clamping force to said upper press plate to firmly press said materials between said upper and lower press plates.

---

## 4,147,103
## FLAT SCREEN LIFT AND INTERRUPT MEANS

**Eric W. Newton, and Geoffrey Scott, both of Bradford, England, assignors to Champion Associated Weavers Limited, Bradford, England**

**Filed Dec. 6, 1976, Ser. No. 747,748**
**Claims priority, application United Kingdom, Dec. 10, 1975, 50683/75**
**Int. Cl.[2] B41F** *15/10, 15/36*
**U.S. Cl. 101—115** **8 Claims**



1. A printing machine comprising a frame; a printing bed supported on the frame; a printing screen supported on said frame and moveable between printing and non-printing positions; a push-rod mounted in position to push said screen from printing position to non-printing position; rotatable cam means mounted adjacent said push-rod for contacting said push-rod and moving said push-rod and screen from printing to non-printing position on rotation of said cam means; cam shaft means connected with said cam means for rotating same; push-rod rest means mounted on said cam shaft means for pivotal movement about said shaft into and out of push-rod engaging position, in which position said rest means prevents movement of the push-rod and screen into printing position; and means for causing said rest means to move into and out of its push-rod engaging position.

---

## 4,147,104
## KEY COLOR CONTROL SYSTEM FOR PRINTING PRESS

**Peter Zernov, Oconomowoc; Raymond E. Young, New Berlin, and Gilbert S. Woythal, Milwaukee, all of Wis., assignors to Zerand Corporation, New Berlin, Wis.**

**Continuation of Ser. No. 757,895, Jan. 10, 1977, abandoned. This application Feb. 13, 1978, Ser. No. 877,503**
**Int. Cl.[2] B41F** *5/06, 5/16*
**U.S. Cl. 101—181** **2 Claims**

1. A register control system for controlling printing repeat length in a printing press comprising:

a printing deck for imprinting repeats and corresponding register marks on a web;

first means to establish a desired repeat length, to detect and measure the magnitude and direction of a repeat length error and for providing an error signal related thereto,

said first means comprising a scanner located downstream of said printing deck for sensing said register mark and a register control connected to said scanner, said register control comprising a counter;

second means connected to said first means to receive said error signal and to correct for said repeat length error by adjusting the tension level on said web ahead of said printing deck,

said second means comprising a dancer and a motor for controlling operation of said dancer, said motor having a motor control for receiving error signals from said register control;

third means connected to said first means to establish limits within which repeat length errors are likely to occur and for which correction in tension level is to be made so as to reduce said repeat length error,

said third means comprising a high limit relay and a low limit relay, said relays being connected to said register control to prevent operation of said motor when said limits are exceeded, said relays being responsive to an electric signal from a potentiometer responsive to the position of said motor;

and fourth means connected to said second means for determining and indicating that repeat length errors are trending to depart from said limits,

said fourth means comprising a warning signal device responsive to said electric signal from said potentiometer.

---

**4,147,105**

## PROTECTIVE DEVICE FOR A PERFECTOR PRINTING PRESS

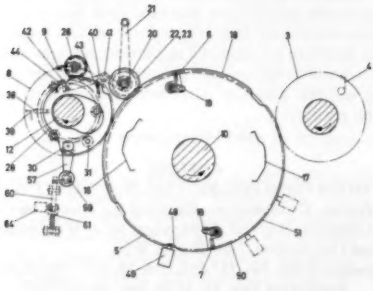
**Willi Becker, Bammental, Fed. Rep. of Germany, assignor to Heidelberger Druckmaschinen AG, Heidelberg, Fed. Rep. of Germany**

**Filed May 9, 1977, Ser. No. 795,022**

**Claims priority, application Fed. Rep. of Germany, May 8, 1976, 2620392**

**Int. Cl.[2] B41F *5/02***

**U.S. Cl. 101—230** **6 Claims**



1. Device for protecting a printing machine, selectively operable in a first-form printing mode or in a perfector printing mode, against damage thereto when changing over from one to the other mode of operation thereof, the printing press having a sheet-storage cylinder and a sheet turn-over cylinder cooperating with the sheet-storage cylinder, respectively means on each of the cylinders for gripping a sheet being printed, means comprising control cams and a gear segment turnably cooperating with said control cams for controlling the sheet-gripping means of the storage cylinder during change-over of the printing machine from one mode of operation to the other, and means for turning the storage cylinder into a respective change-over position, the device for protecting the printing machine comprising means for securing the turn-over cylinder against rotation while the storage cylinder is being turned by the turning means, means shiftable between respective end positions for controlling the sheet-gripping means of the turn-over cylinder during the change-over of the machine, electromechanical means for ensuring that the control means for the gripping means of the turn-over cylinder is in one of the respective end positions thereof, and electrical switching means responsive to a turning of the turnable gear segment and of the storage cylinder and cooperating with said electromechanical means for preventing operation of the printing machine until it is changed over to the respective mode of operation thereof.

---

**4,147,106**

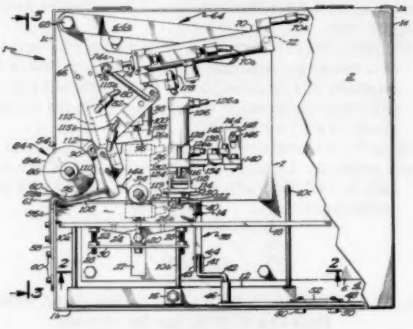
## TAG FEEDING APPARATUS

**Harold R. McGregor, 715 Cardinal Dr., Owatonna, Minn. 55060**

**Filed Jul. 5, 1977, Ser. No. 812,850**

**Int. Cl.[2] B41F *13/24***

**U.S. Cl. 101—232** **20 Claims**



1. Tag feeding apparatus comprising:

tag holding means for supporting a stack of tags and comprising rear stop means for restraining the trailing edge of the tags, leading edge retainer means positioned adjacent an output side of said tag holding means to restrainably engage the leading edge of tags in a stack, and follower means for engaging the last tag in the stack and pressing said tag stack in a direction generally normal thereto to urge the first tag in the stack against said rear stop means and leading edge retainer means;

a tag delivery arm swingably movable between a tag pickup position adjacent the output side of said holding means and a remote, tag delivery position;

tag clamping means carried on said delivery arm and operable to clamp a tag at said tag pickup position;

a tag displacement arm having tag engaging means thereon, said tag displacement arm being swingably movable through a displacement stroke from a forward rest position to a rearward displacement position through a path wherein said tag engaging means contacts the first tag in said stack and displaces its leading edge rearwardly from said leading edge retainer means, and said tag displacement arm being movable through a return stroke back to said rest position wherein it carries said tag leading edge forwardly to a location free from said leading edge retainer means in position to be received and gripped by said

clamp means with said delivery arm in said tag pickup position;

power means for swingably moving said delivery arm and displacement arm between said positions, said tag delivery arm and said tag displacement arm being mounted for pivotal movement about separate pivot points; and

linkage means connecting said tag delivery arm and said tag displacement arm to said power means, said linkage means being operative in response to actuation by said power means to simultaneously swing said arms in opposite directions about said separate pivot points, with said tag displacement arm being moved rearwardly on said displacement stroke to free the next tag in a stack as said delivery arm is simultaneously swung forwardly to said delivery position with a previously displaced tag by the movement of said power means in a first direction, and with said tag displacement arm being moved forwardly through said return stroke to position a tag for pickup as said tag delivery arm is swung rearwardly to said tag pickup position by the movement of said power means in a second direction.

8. Tag feeding apparatus for handling relatively thin tags having a thickness between 0.003 and 0.010 inches comprising:

tag holding means for supporting a stack of tags and having a tag output side, said tag holding means comprising rear stop means for restraining tags in a stack against movement rearwardly away from said tag output side, leading edge retainer means positioned at said tag output side to restrainably engage a tag stack adjacent the leading edges of tags in a stack, follower means positioned to bear against the last tag in a stack in a direction generally normal thereto to urge the first tag in a stack against said leading edge retainer means and an outer stack holder positioned between said rear stop means and said leading edge retainer means to bear against the front face of the first tag in a stack in opposed relation to said follower means to resist the force of said follower means;

a tag displacement arm having a member thereon for engaging the first tag in a stack, said displacement arm being movable through a tag displacement stroke towards said rear stop means from a forward rest position to a rearward displacement position through a path wherein said tag engaging member remains between said leading edge retainer means and said outer stack holder and contacts the first tag in a stack and displaces its leading edge rearwardly from said leading edge retainer means, and said displacement arm being movable through a return stroke back to said rest position wherein it carries a tag leading edge forwardly to a pickup location at said tag output side free from said leading edge retainer means;

a tag delivery arm having tag pickup means thereon and movable between a tag pickup position adjacent the output side of said holding means and a remote tag delivery position;

first power means operably interconnected with said delivery arm and said displacement arm and movable in first and second directions for simultaneously moving said delivery arm and said displacement arm between said positions, with said displacement arm being moved rearwardly on said displacement stroke to free the next tag in a stack as said delivery arm is swung forwardly to said delivery position with a previously displaced tag by the movement of said power means in a first direction, and with said tag displacement arm being moved forwardly through said return stroke to position a tag for pickup as said tag delivery arm is swung rearwardly to said tag pickup position by the movement of said power means in a second direction;

a printing head positioned between said rear stop means and said outer stack holder out of the path of movement of said delivery arm and said displacement arm, said printing head being reciprocally movable towards a stack of tags in said tag holding means on a printing stroke and away therefrom on a return stroke in a direction normal to the plane of tags stacked in said holding means to imprint the first tag in a stack; and

second power means for moving said printing head back and forth through said printing and return strokes.

---

**4,147,107**

## AMMUNITION CARTRIDGE

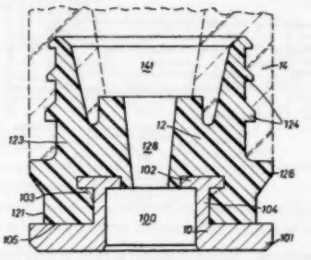
**Lars Ringdal, Juan-les-Pins, France, assignor to KUPAG Kunststoff-Patent-Verwaltungs AG, Switzerland**

**Filed Feb. 9, 1977, Ser. No. 767,031**

**Claims priority, application Norway, Feb. 17, 1976, 760525; Switzerland, Dec. 6, 1976, 15297/76**

**Int. Cl.² F42B 5/26**

**U.S. Cl. 102—43 P** **8 Claims**




1. An ammunition cartridge of the type comprising a cartridge case consisting, at least in a predominant cartridge case portion, of a synthetic plastics material and having a lower end portion for receiving and holding a cartridge bottom insert, said cartridge bottom insert being a composite unit comprising a single metal bottom element and a sleeve element made of a synthetic plastics composition, said single metal bottom element being firmly secured in said sleeve element, said sleeve element being molded onto said single metal bottom element and said single metal bottom element is an integral structure made of a sheet metal capable of being shaped by deep-drawing, said structure comprising a bottom plate having a diameter sufficient to form an extraction rim and having a coaxial chamber for receiving and holding a detonator cap, said chamber having an apertured upper wall portion and at least one laterally projecting means for anchoring said metal bottom element in said sleeve element.

---

**4,147,108**

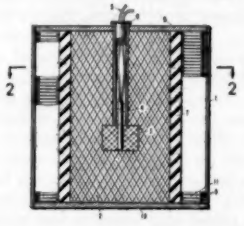
## WARHEAD

**Bertram W. Gore, Owings Mills; Nicholas J. LaCosta, and Irwin R. Barr, both of Kingsville, all of Md., assignors to AAI Corporation, Cockeysville, Md.**

**Filed Mar. 17, 1955, Ser. No. 495,252**

**Int. Cl.² F42B 13/48**

**U.S. Cl. 102—67** **9 Claims**

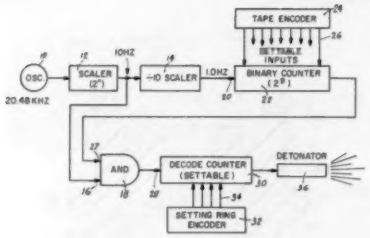



1. An explosive device comprising an explosive charge, a casing enclosing said charge, said casing being formed of rub-

ber, a plurality of projectiles arranged arroung the exterior of said casing in juxtaposition therewith, means for detonating said explosive charge, and container means enclosing said projectiles and said explosive charge.

---

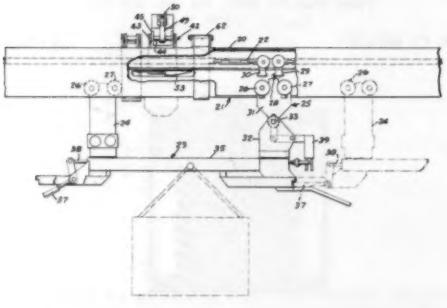
**4,147,109**
**CONTROLLED RANGE FUZE**
**Richard T. Ziemba, Burlington, Vt., assignor to General Electric Company, Burlington, Vt.**
**Filed Feb. 17, 1977, Ser. No. 769,756**
**Int. Cl.[2] F42C *17/00***
**U.S. Cl. 102—215** **8 Claims**




1. An electronic, digital ordnance fuze comprising:
a first counter having an input means and having an output means for providing a first signal upon counting to a full count;
first means for presetting said fist counter to a selected first count;
a second counter having an input means and having an output means for providing a second signal upon counting to a full count;
second means for presetting said second counter to a selected second count;
means for providing pulses at a first rate to said input means of said first counter, and for providing pulses, at a second rate which is equal to product of multiplication of said first rate by the full count of said second counter, upon said first counter providing said first signal.

---

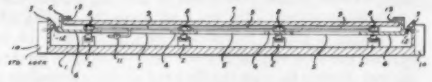
**4,147,110**
**POWER AND FREE CONVEYOR SYSTEM**
**Kenneth F. Knudsen, St. Clair Shores, Mich., assignor to American Chain & Cable Company, Inc., Bridgeport, Conn.**
**Filed Jun. 22, 1977, Ser. No. 808,809**
**Int. Cl.[2] B61J *3/04***
**U.S. Cl. 104—172 S** **32 Claims**



1. In a power and free conveyor system, the combination comprising
a power track,
a power conveyor movable along said track,
said conveyor having a plurality of depending pusher and holdback dogs thereon,
a free track extending along said power track,
a plurality of carriers movable along said free track,
each said carrier having at least one trolley with a pusher normally in the path of said depending pushers,
each said pusher and holdback dog being deflectable laterally independently of the other into and out of the path of the pusher on said trolleys,
a combined cam and stop member,
means for moving said cam and stop member into the path of said pusher on said carrier,
said cam and stop member including a cam portion operable to deflect the depending pusher and holdback dogs successively out of the path of the pusher and a stop portion operable to deflect the pusher out of the path of said dogs.

---

**4,147,111**
**LOAD DISTRIBUTIVE CARGO PLATFORM SYSTEM**
**Joseph L. Weingarten, 1927 Oak Tree Dr., E., Dayton, Ohio 45440**
**Filed Jun. 17, 1977, Ser. No. 807,619**
**Int. Cl.[2] B60P *7/08***
**U.S. Cl. 105—463** **1 Claim**



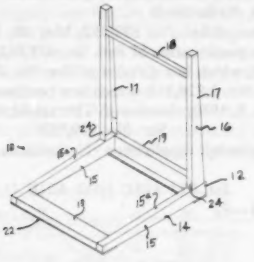
1. An integrated pallet and support system to be used in conjunction with a standard cargo aircraft roller, rail and lock system, comprising:
a. multiple parallel longitudinal skids upon which the system slides over aircraft mounted rollers, wherein the side skids both extend outward sufficiently to mate with the aircraft rails and lock systems and, also, extend upward and inward to enclose the outer edge of the pallet to limit the magnitude of its upward travel;
b. multiple flexible cross members interconnecting the skids;
c. multiple hydraulic lifting means situated upon the skids and hydraulically connected in parallel;
d. a cargo pallet which is sufficiently rigid to translate localized load stresses throughout the whole pallet while floating upon the multiple hydraulic lifting means and confined at its outer edges by the side skids; and
e. a hydraulic valve connected to the interconnected hydraulic means and to a source of hydraulic pressure.

---

**4,147,112**
**CARGO SUPPORT**
**Carlos J. Green, 4312 Neyrey Dr., and L. John Hirsius, Jr., 4400 Neyrey Dr., both of Metairie, La. 70002**
**Filed Aug. 1, 1977, Ser. No. 820,756**
**Int. Cl.[2] B61D *45/00***
**U.S. Cl. 105—463** **10 Claims**

1. A cargo support brace comprising:
a. a lower floor contacting member, said lower floor contacting member providing a lower ground contacting surface and an upper load bearing surface, said upper load bearing surface being capable of receiving a palletized cargo load thereon, said ground contacting surface and said load bearing surface being angularly deposed to provide a bevel to said lower floor contacting member, said lower floor contacting member comprising a pair of spaced tapered feet and at least one structural cross brace rigidly connecting said pair of spaced tapered feet; and
b. an upper substantially vertically mounted brace member rigidly connected during operation to said lower floor contacting member, the connection being at the respective

end portions of said upper brace member and said lower floor contacting member, said vertical brace member



being attached to the thickest end portion of said tapered feet.

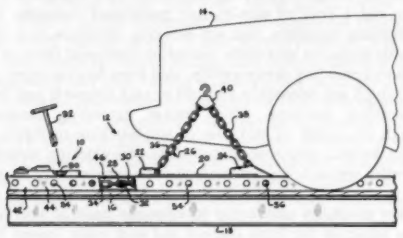
---

**4,147,113**

## TIE-DOWN WINCH

**Donald C. Kilgus, deceased, late of Grosse Pointe Woods, Mich., by Marjorie M. Kilgus, executrix, 1288 Fairholme Rd., Grosse Pointe Woods, Mich. 48236**

**Filed Aug. 11, 1977, Ser. No. 823,661**
**Int. Cl.[2] B60P** *7/08*
**U.S. Cl. 105—477** **7 Claims**



1. A tie-down winch for use in a vehicle tie-down system and in combination with longitudinally extending guide means adapted to be secured to a transport vehicle, said guide means including upright wall members having means forming a plurality of longitudinally spaced apart openings therein, said winch including a body member, a fixed projection on said body member extending into one of said wall openings to restrain movement in one direction of said winch longitudinally of said wall member, and abutment means including a flat surface in one quadrant of said body member engaging said wall member at a position spaced forwardly of said projection and cooperating therewith to restrain pivoting of said body member about said projection when forces are exerted on said body member in said one direction, said body member being curved in quadrants adjacent to said one quadrant to allow for assembly and disassembly within the guide means.

---

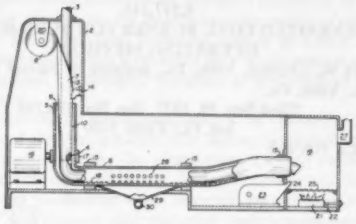
**4,147,114**

## WASTE TREATMENT SYSTEM

**Wayne W. Holmes, Brigham City, Utah, assignor to Thiokol Corporation, Newtown, Pa.**

**Filed Nov. 4, 1977, Ser. No. 848,623**
**Int. Cl.[2] B01D** *33/00;* **F23G** *5/02*
**U.S. Cl. 110—221** **11 Claims**

1. A waste treatment system comprising:
a sewage delivery tube having a discharge end for introducing sewage into the system;
a conveyor pipe having an input end and a discharge end and perforations in an intermediate zone thereof, the input end of which surrounds the discharge-end portion of the delivery tube with an annular space therebetween;
a funnel positioned directly beneath the perforations to collect liquid from sewage;
a long, flat, porous strip of consumable filter material, one end of which is inserted into the conveyor pipe around the sewage delivery tube;
means for storing the filter strip;
means for continuously forming the strip of filter material into a closed tube prior to its entry into the conveyor pipe;



a vibrator attached to the conveyor pipe to oscillate it along the axis thereof;
ratchet teeth inside the conveyor pipe oriented to urge the sludge-containing filter toward the discharge end thereof, when oscillated; and
an incinerator in communication with the discharge end of the conveyor pipe to receive sludge therefrom, having a source of heat capable of burning sludge.

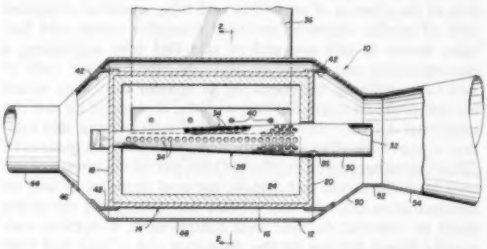
---

**4,147,115**

## INCINERATOR WITH GAS GENERATION

**Alfred M. Leppert, 906 Bibb Ave., Auburn, Ala. 36830**

**Filed Sep. 14, 1977, Ser. No. 833,167**
**Int. Cl.[2] F23G** *5/12*
**U.S. Cl. 110—244** **16 Claims**



9. An incinerator system comprising, in combination,
a combustion chamber having spaced end walls joined by a substantially cylindrical side wall,
an elongated slot formed in said side wall defining an inlet nozzle extending longitudinally of the side wall throughout at least a major portion of the length of the combustion chamber,
inlet duct means connected to said inlet nozzle for supplying combustion air and combustible waste material into the combustion chamber, said duct and nozzle being shaped to discharge a thin stream of the air and waste material in a direction substantially tangential to the inner surface of the combustion chamber adjacent the inlet nozzle,
an elongated gas collector tube mounted coaxially within and extending substantially the full length of the combustion chamber, said collector tube having one end extending outwardly therefrom through an opening in one of said end walls and terminating in an open outlet, the portion of said collector tube within said combustion chamber

being substantially frusto-conical and having its larger end extending through said opening in said one wall,

a plurality of openings formed in said collector tube and spaced along substantially its full length within the combustion chamber to permit gases to flow into the collector tube from the combustion chamber and out said outlet, and

auxiliary burner nozzle means for heating the combustion chamber to ignite combustible material entering the combustion chamber through said inlet nozzle.

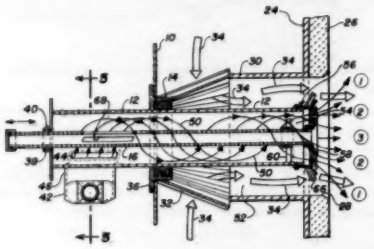
---

**4,147,116**

## PULVERIZED COAL BURNER FOR FURNACE AND OPERATING METHOD

**Robert W. Graybill, York, Pa., assignor to Farrier Industries, Inc., York, Pa.**

**Filed Sep. 19, 1977, Ser. No. 834,236**
**Int. Cl.[2] F23K 5/00**
**U.S. Cl. 110/263** **7 Claims**



1. A pulverized coal burner for a furnace comprising in combination, an elongated fuel tube, a tangential spiral delivery conduit connected to an inlet opening at one end of said fuel tube and adapted to receive finely divided coal free from air and conveyed by a minimum proportion of inert dry steam to insure delivery of said coal to the opposite end of said fuel tube in the absence of air within said tube, a central elongated tube of smaller diameter mounted coaxially within said fuel tube, means at said one end of said fuel tube supporting a corresponding end of said central tube, the opposite ends of said tubes defining therebetween an annular discharge means for said coal and steam mixture with the absence of air and the tangential delivery thereof to said fuel tube causing said mixture to move spirally and axially along said tube in a manner to cause centrifugal force to effect at least partial separation of the coal from the steam and dispose the coal particles in heavier concentration near the wall of said fuel tube while the steam tends to concentrate near said central tube, a circular outwardly flared diffuser on the discharge end of said fuel tube and an outwardly flared circular deflector on the delivery end of said central tube, an annular air inlet port adapted to be mounted in a furnace wall and coaxially surrounding said fuel tube adjacent the discharge end thereof, and means to deliver combustion air under pressure to said inlet port for mixture with the pulverized coal discharged spirally in an outwardly flared pattern, from said annular discharge means, whereby said coal is at least partially separated from said steam when exiting from said annular discharge means and is delivered to the combustion zone immediately adjacent the delivery of combustion air thereto for maximum burning efficiency with minimum smothering effect by the inert steam due to minimum ratio of inert steam to coal, said central tube is provided with steam inlet means adjacent the inlet end of said fuel tube operable to permit a portion of the inert steam of said mixture of steam and coal which is concentrated near said central tube by the centrifugal spiralling of said mixture for passage of said portion of steam through said central tube to the discharge end thereof where the greatest ratio of steam to coal occures as the same is delivered to said combustion zone.

**4,147,117**

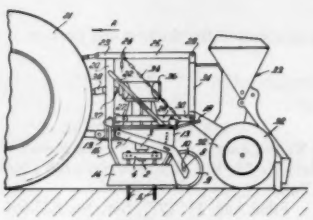
## CULTIVATING IMPLEMENTS

**Ary van der Lely, Maasland, and Cornelis J. G. Bom, Rozenburg, both of Netherlands, assignors to C. van der Lely N.V., Maasland, Netherlands**

**Continuation of Ser. No. 579,252, May 20, 1975, abandoned, which is a continuation of Ser. No. 473,562, May 28, 1974, abandoned, which is a division of Ser. No. 246,738, Apr. 24, 1972, Pat. No. 3,826,314, which is a continuation of Ser. No. 43,006, Jun. 3, 1970, abandoned. This application Feb. 21, 1978, Ser. No. 879,759**

**Claims priority, application Netherlands, Jun. 10, 1969, 6908785**

**Int. Cl.[2] A01C 5/00; A01B 33/00**
**U.S. Cl. 111—52** **8 Claims**



1. A cultivating implement for attachment to a lifting hitch of a tractor comprising a coupling member on elongated frame means and a row of side-by-side positioned rotatable tined soil-working members, said soil-working members each being rotatable about an upwardly extending shaft and tines on said members extending downwardly, said tines having upper portions which are releasably secured to said supports and lower soil-working portions, roller means extending transverse through the width of said row of soil-working members and trailing behind said row of rotatable soil-working members, said roller means being rotatable about a substantially horizontal axis, the ends of said roller means being mounted on arms that are pivotably connected to opposite ends of said frame means adjacent the front thereof and said roller means being positioned adjacent the paths defined by said tines, said roller means supporting a substantial part of the weight of said implement, to crumble the soil and prepare a seed bed, said coupling member together with said tines and the roller means comprising the sole supporting means for the implement, a seed drill, said seed drill being connected to said frame means and being located to the rear of said roller means, said seed drill having a frame that is detachably linked to said implement by linkage means, said linkage means comprising coupling arms extending forwardly from the frame over and above said elongated frame means to pivot connections to said coupling member and said coupling arms are each freely pivotable about a transverse axis.

---

**4,147,118**

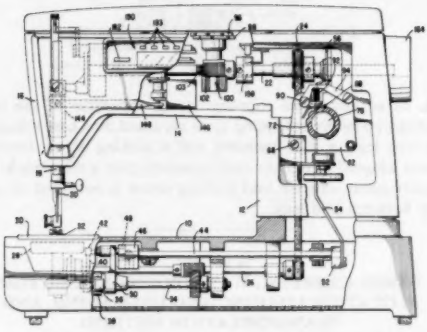
## COMBINED ELECTRONIC AND MECHANICAL PATTERN CONTROL FOR A SEWING MACHINE

**Kenneth D. Adams, Madison, N.J., assignor to The Singer Company, New York, N.Y.**

**Filed Nov. 14, 1977, Ser. No. 851,072**
**Int. Cl.[2] D05B 3/04**
**U.S. Cl. 112—158 E** **4 Claims**

1. In a sewing machine having stitch forming instrumentalities for producing successive stitches in a variety of stitch patterns including a needle supported for endwise reciprocating and relative lateral jogging movements, a work feed means including mechanism for feeding a fabric relative to said needle between needle penetrations, a needle jogging mechanism for initiating relative lateral jogging movement of said needle for producing needle patterns, electric motor means operatively connected to said jogging mechanism and responsive to stitch

position coordinate electric signals for initiating relative lateral jogging movement of said needle to stitch position coordinates corresponding to said stitch position coordinate electric signals, static memory means for storing stitch position coordinate data for said jogging mechanism, logic means operable in timed relationship with said machine for selecting and extracting stitch position coordinate data from said memory means, converter means for converting stitch position coordinate data from said memory means into stitch position coordinate signals for operating said electric motor means, operator influenced means connected to said static memory means for selecting a stitch pattern from said memory means such that when a stitch



pattern is selected by an operator, the jogging means will initiate relative lateral movement of said needle for reproducing the stitch pattern stored in said memory means, and said work feed means further including cam means having at least one cam with said cam having a cam surface with work feed pattern information contained thereon, cam follower means for transmitting work feed pattern information from such cam to said work feed mechanism, and operator actuable control means for selectively engaging the cam follower means with said cam and enabling an operator to predetermine a defined operating phase relationship between the work feed mechanism and the jogging mechanism.

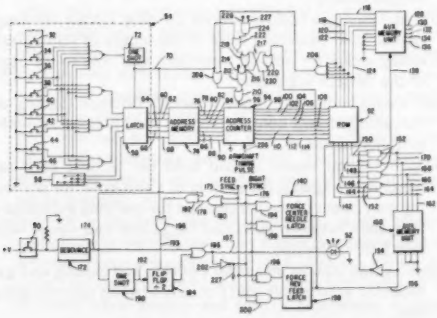
---

**4,147,119**

## SEWING MACHINE DUAL MODE BACKTACK CONTROL

**William H. Dunn, Branchville, N.J., assignor to The Singer Company, New York, N.Y.**

**Filed Feb. 28, 1978, Ser. No. 882,008**
**Int. Cl.[2] D05B** *27/00, 3/02, 69/18*
**U.S. Cl. 112—317** **8 Claims**



**1.** In a sewing machine having stitch forming instrumentalities including a reversible work feeding mechanism, an actuating mechanism for said stitch forming instrumentalities and a work feed reversing system controlled by a single operator influenced actuator having two states, said actuator normally being in a first of said states when there is no operator influence thereon, means for providing two different modes of operation of said work feed reversing system comprising:

signal generating means associated with said actuating mechanism and effective differentially for indicating an operative from an inoperative condition of said actuating mechanism;

circuit means including said single operator influenced actuator and means responsive to an indication from said signal generating means of an operative condition of said actuating mechanism for establishing one mode of operation of said work feed reversing system in which said work feed mechanism is reversed only while said actuator is maintained by operator influence in the other of said states; and

means in said circuit means responsive to an indication from said signal generating means of an inoperative condition of said actuating means for establishing another mode of operation of said work feed reversing system in which said work feed mechanism when reversed by operator influence of said actuator into said other state is maintained in reverse upon return of said actuator into said first state by removal of operator influence from said actuator, and said work feeding mechanism is shifted out of reverse by a succeeding operator influence of said actuator into said other state followed by a return of said actuator to said first state.

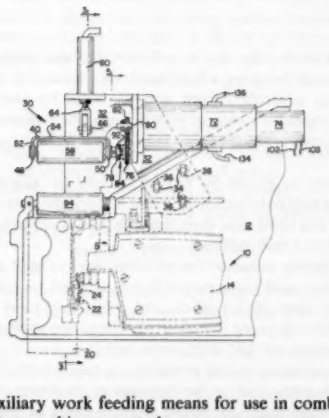
---

**4,147,120**

## AUXILIARY FEED MECHANISM FOR SEWING MACHINES

**Maximilian Adamski, Jr., Wheeling; Robert C. Talsma, Glen Ellyn, and Richard E. Walters, Hoffman Estates, all of Ill., assignors to Union Special Corporation, Chicago, Ill.**

**Filed Sep. 14, 1977, Ser. No. 833,110**
**Int. Cl.[2] D05B** *21/00*
**U.S. Cl. 112—318** **19 Claims**



**1.** An auxiliary work feeding means for use in combination with a sewing machine mounted on a support means and having a frame means, needle means, motor means operatively coupled with said needle means for moving same into and out of a work engaging position, means operative to advance the work to said needle means, and means operative to actuate said machine in a timed sequence, said auxiliary work feeding means comprising:

a feed roller means adapted for movement between two positions, wherein said feed roller means is operative in one but not the other of said positions to concomitantly advance the workpiece with said means operative to advance;

first sensing means for producing a first set of signals representative of the speed of said motor means;
means for driving said feed roller means at variable speeds;
second sensing means adapted to produce a second set of signals representative of the speed of said means for driving; and
electrical circuitry means adapted to actuate the means for driving said feed roller means in response to said means operative to actuate and to track the speed of said motor means whereby any increase or decrease in the motor means speed will effect the feeding rate of the feed roller.

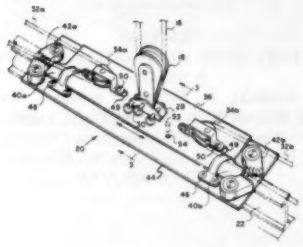
---

**4,147,121**

## SELF-RELEASING TRAVELER AND CAM CLEAT

**Hans M. Fogh, 3392 Credit Heights Dr., and Evert J. Bastet, Apt. 708, 3045 Queen Frederica Dr., both of Mississauga, Canada**

**Continuation-in-part of Ser. No. 704,834, Jul. 13, 1976, abandoned. This application Nov. 3, 1977, Ser. No. 848,123**
**Int. Cl.[2] B63B *21/24***
**U.S. Cl. 114—204** **19 Claims**



1. A traveler for use in sailboats and the like, adapted to move to and fro along a fixed track way located in the sailboat, and being controlled from opposite sides by two respective control ropes by means of which it may be positioned at various different positions along the track way, said traveler comprising:
traveler car means for moving to and fro along said track way and adapted for carrying a block thereon for tensioning of a third rope therethrough in two opposite directions across a said sailboat;
cleat means mounted on opposite sides of said traveler car means, said cleat means being adapted to releasably engage respective said control ropes, said cleat means and said block being movable relative to one another along the direction of said track way, and,
cleat releasing means mounted on said traveler car means, and connected to be responsive to relative movement between said cleat means and said block to move between respective cleat engaging and disengaging positions.

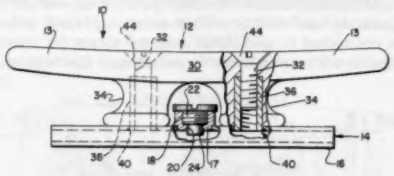
18. A releasable cam cleat of the type used for securing ropes on a sailboat, and the like, said cam cleat having at least one clamping cam movable between a rope releasing and a rope clamping position, and a cam releasing member mounted for movement between cam engaging and disengaging positions, said cam being movable independently of said cam releasing member when the same is disengaged from said cam, movement of said cam releasing member into engagement with said cam, moving said cam into its rope releasing position as aforesaid.

**4,147,122**

## DECK CLEAT

**Carl A. Merry, Marion, Mass., assignor to Schaefer Marine Products, New Bedford, Mass.**

**Filed Oct. 11, 1977, Ser. No. 840,976**
**Int. Cl.[2] B63B *21/04***
**U.S. Cl. 114—218** **4 Claims**



1. In an adjustable rope-anchoring apparatus of the type having oppositely-extending arms mounted on a base comprising two legs, a slide member and a locking screw forming means adapted to tighten said apparatus onto a slide track, the improvement wherein said locking screw is mounted on said base between said legs.

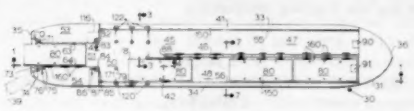
---

**4,147,123**

## BARGE-CARRYING WATERBORNE VESSEL FOR FLOTATION LOADING AND UNLOADING, AND TRANSPORTATION METHOD

**William E. Kirby, Victoria, Hong Kong, and David J. Seymour, Daly City, Calif., assignors to Wharton Shipping Corporation, Edificio Vallarino, Panama**

**Continuation-in-part of Ser. No. 775,936, Mar. 9, 1977, which is a continuation-in-part of Ser. No. 701,696, Jul. 1, 1976, abandoned. This application Oct. 14, 1977, Ser. No. 842,280**
**The portion of the term of this patent subsequent to Jan. 23, 1996, has been disclaimed.**
**Int. Cl.[2] B63B *35/40***
**U.S. Cl. 114—260** **42 Claims**

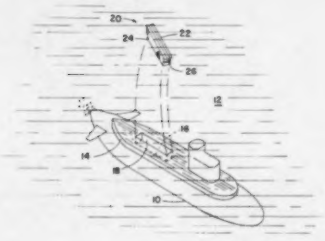


1. A barge-carrying waterborne vessel including in combination:
a hull with rigid supporting and hull-reinforcing structure, a bow, a stern, and side walls providing a series of buoyancy compartments,
said hull having a hollow interior defining at least one longitudinal hold extending most of the length of said vessel,
flooding means for putting water into said hold to the depth of the vessel's waterline,
gate means at one end of said vessel for flotation loading and unloading of said hold, when said hold is flooded, with a plurality of barges,
barge-retention means in said hold for holding each said barge down against the bottom of a said hold, for preventing movement of the barges, and for enabling exchange of buoyancy between each said barge and said vessel when said hold is flooded,
opening and closing means for opening and closing said gate means so as to enable said flotation loading and unloading, and
barge-moving means in said hollow interior comprising flow-creating means for causing flow of water to move barges in said hold in one direction during flotation loading and in the other direction during flotation unloading.

## 4,147,124
## APPARATUS FOR LAUNCHING STORES FROM A SUBMERGED VEHICLE

John D. Brooks, San Diego; Harry W. Humason, Encinitas, and Frank E. Gordon, San Diego, all of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sep. 26, 1977, Ser. No. 836,324
Int. Cl.[2] B63G *8/30*
U.S. Cl. 114—321 10 Claims



1. Apparatus for moving stores launched from a hydrodynamically streamlined platform submerged in an underwater environment through a hydrodynamically stable path in said underwater environment, said apparatus comprising:

buoyancy means formed of selected buoyant material for providing specified buoyancy to a store container assembly which includes said stores and said buoyancy means, said store container assembly being launched from said platform, said buoyancy means being provided with a cavity of specified dimensions, said buoyancy means having a rectangular cross section, said buoyancy means having a plurality of flat external surfaces which are exposed to the ambient pressure of said underwater environment when said store container assembly has been launched from said platform into said underwater environment;

pressure resistance means having a circular cross section and contained within said cavity for resisting the ambient pressure of said underwater environment on said external surfaces of said buoyancy means, said pressure resistance means enclosing said stores for protecting said stores from the ambient pressure of said underwater environment when said store container assembly has been launched into said underwater environment, said pressure resistance means comprising a part of said store container assembly;

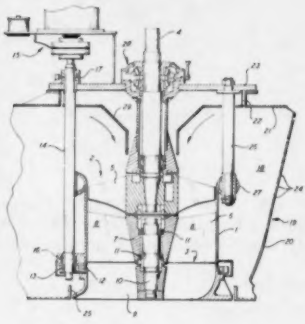
hydrodynamic stabilization means joined to said buoyancy means for resisting vertical motion and lateral motion about the center of balance of said store container assembly when said store container assembly has been launched into said underwater environment, said hydrodynamic stabilization means comprising a part of said store container assembly; and

means for maintaining the hydrodynamic streamlining of said platform comprising a first means for maintaining the hydrodynamic streamlining of said platform before said store container assembly has been launched into said underwater environment, and further comprising a second means for maintaining the hydrodynamic streamlining of said platform after said store container assembly has been launched into said underwater environment, said first means being launched into said underwater environment when said store container assembly is launched.

## 4,147,125
## STEERING AND PROPULSION MEANS FOR SHIPS OR OTHER VESSELS

Owen G. Slade, Cowes, England, assignor to Carrier Corporation, Syracuse, N.Y.

Filed Jul. 8, 1977, Ser. No. 814,063
Claims priority, application United Kingdom, Jul. 26, 1976, 31006/76
Int. Cl.[2] B63H *11/02*
U.S. Cl. 115—14 14 Claims



1. A propulsion unit for a vessel having a compartment watertightly sealed from the remainder of the vessel, said unit comprising:

an open ended, vertically extending cylindrical member supported within said compartment;

means mounted within said cylindrical member including pump means to propel a motivating fluid from the inlet of said cylindrical member to the outlet thereof, the inlet of said member being vertically positioned above said pump means and the outlet vertically below said pump means, and

deflector means disposed adjacent the outlet of said cylindrical member to direct the motivating fluid in a substantially horizontal direction whereby a thrust is developed to move said vessel.

---

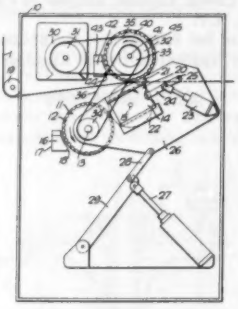
## 4,147,126
## COATING APPARATUS

Aubrey F. Riggs, Knebworth, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Dec. 13, 1976, Ser. No. 750,020
Claims priority, application United Kingdom, Jan. 15, 1976, 1613/76; Dec. 1, 1976, 50092/76
Int. Cl.[2] B05C *1/08*
U.S. Cl. 118—227 6 Claims

1. Apparatus for simultaneously applying a coating to each surface of a moving continuous web comprising a first, fixedly positioned, rotatably driven gravure roll, a transfer roll rotatable in an operative position in simultaneous contact with the surface of the first gravure roll and with a first surface of the moving web, a second gravure roll rotatable in contact with a second surface of the moving web and cooperating with the transfer roll to provide a nip through which the web may be passed, means for supplying a coating medium to the surface of the second gravure roll, mounting means for the transfer roll, said mounting means being operable to displace the transfer roll, relative to the fixedly positioned gravure roll, to an inoperative position in which the transfer roll is disengaged from the web surface but is rotatable in contact with the surface of the first gravure roll, means for disengaging the transfer roll from the surface of the first gravure roll, means for supplying a coating medium to the surface of the first gravure roll when the transfer roll is in both its operative and inoperative positions whereby when the transfer roll is in its inoperative posi-

tion it continues to receive coating material from the first gravure roll so that a crust of dry coating material does no



accumulate on the transfer roll, and means to cause the web to adopt a path which is clear of the transfer roll and both gravure rolls when the transfer roll is in the inoperative position.

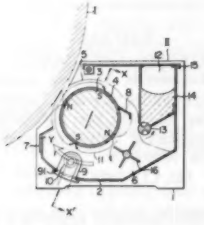
---

**4,147,127**

## TONER CONCENTRATION DETECTING APPARATUS

**Isamu Terashima, Hitachi, Japan, assignor to Hitachi, Ltd., Japan**

**Filed Oct. 13, 1977, Ser. No. 841,737**
**Claims priority, application Japan, Oct. 16, 1976, 51-124272**
**Int. Cl.[2] G03G *13/09***
**U.S. Cl. 118—646** **6 Claims**



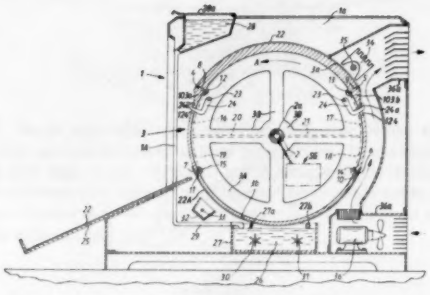
1. In an apparatus used with a developing apparatus for detecting the concentration of a toner comprised in a developer, said detecting apparatus comprising developer feeder means and said developer including a magnetic carrier and a coloring toner, said developer feeding means including a fixed permanent magnet and a non-magnetic sleeve rotatably mounted around the outer periphery of said permanent magnet, said developing apparatus being adapted for image development by use of a developer magnet brush made of said permanent magnet, the improvement further comprising at least one detecting coil magnetically acting upon said developer, said detecting coil being formed in a flat plate perpendicular to the axis thereof, said detecting coil being located in the flow of said developer in such a manner that said coil axis intersects with the direction of the flow of said developer substantially at right angles to each other.

**4,147,128**

## APPARATUS FOR CLEANING AND DEVELOPING DIELECTRIC RECEPTOR SHEETS

**Jürgen Müller, Munich, Fed. Rep. of Germany, assignor to AGFA-Gevaert AG, Munich, Fed. Rep. of Germany**

**Filed Dec. 23, 1977, Ser. No. 863,868**
**Claims priority, application Fed. Rep. of Germany, Dec. 30, 1976, 2659584**
**Int. Cl.[2] G03G *13/10***
**U.S. Cl. 118—652** **10 Claims**



1. Apparatus for treatment of dielectric receptor sheets of predetermined length which are adapted to receive latent images, especially latent images of X-rayed objects, comprising a drum-shaped conveyor rotatable about a substantially horizontal axis and including first and second sections respectively having first and second convex external surfaces of larger and smaller radii, the length of said first surface in the circumferential direction of said conveyor being less than and the length of said second surface being at least equal to said predetermined length; discrete first and second sheet attracting means respectively associated with said first and second sections and being operable to attract sheets to the external surfaces of the respective sections whereby the leading and trailing portions of a sheet which carries a latent image and whose median portion overlies said first external surface extend inwardly of said first section; a liquid-containing vessel disposed below said conveyor; means for maintaining the upper level of liquid in said vessel in a plane which is located below said second external surface but is sufficiently high to enable the liquid to contact the median portion of a sheet which is attracted to said first surface; and a cleaning device adjacent to said conveyor and being operable to effect separation of dust or the like from a sheet which is attracted to said second surface.

---

**4,147,129**

## ANIMAL PLATFORM

**Norman P. Ruplen, 3, Orchard Hill, Hamilton, Ontario, Canada (L8P 2V6)**

**Filed Jul. 20, 1977, Ser. No. 817,214**
**Int. Cl.[2] A01K *29/00***
**U.S. Cl. 119—1** **17 Claims**

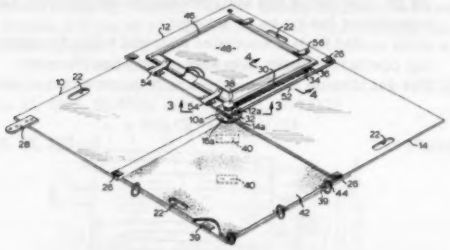
1. An animal platform comprising:

a plurality of platform parts mountable on a floor and pivoted together for movement between an open operative position in which they provide a platform having an upper surface on which the animal can move about the platform and a closed overlapping storage position, the said platform parts all overlapping one another at a central part of the platform in said open operative position, a pivot member passing through the central part of the platform and connecting the platform parts together,

means on the upper surface of one platform part providing a sleeping station for the animal,

means on the upper surface of another platform part providing a toilet station for the animal, and

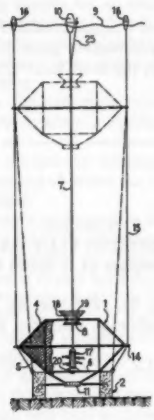
means for tethering the animal to the platform for movement within the outer boundary of the platform freely between



the said stations, and also on parts of the platform not occupied by the stations.

---

**4,147,130**
**FISH BREEDING CAGE STRUCTURE**
**Olivier P. Goguel, 80 rue Michel-Ange, 75016 Paris, France**
**Filed Mar. 16, 1977, Ser. No. 778,262**
**Claims priority, application France, Mar. 25, 1976, 76 08667**
**Int. Cl.[2] A01K *63/00***
**U.S. Cl. 119—3** **16 Claims**

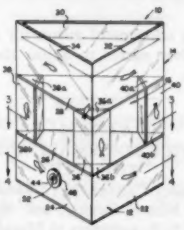


1. A fish breeding cage structure comprising a cage, means for retaining said cage entirely below the surface of the water, said cage having an upper portion, means defining an opening in said upper portion, guide means extending from inside said cage to the surface of the water, a feeding means movably mounted on said guide means for moving between the surface and the inside of said cage for supplying food to fish inside said cage, means for moving said feeding means along said guide means, a closing device for closing said opening when said feeding means is located within said cage, and said feeding means moving said closing device when said feeding means is raised.

---

**4,147,131**
**ELEVATED AQUARIUM TANK**
**Gentle J. Walker, Detroit, Mich., assignor to Paul C. Harvey, Detroit, Mich.; a part interest**
**Filed Apr. 18, 1977, Ser. No. 788,275**
**Int. Cl.[2] A01K *64/00***
**U.S. Cl. 119—5** **6 Claims**

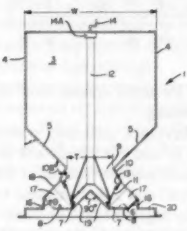
1. A multi-tier aquarium comprising at least a pair of superimposed spaced apart aquarium tanks, the lower of said tanks having a bottom wall, a top wall and sidewalls, and the higher of said tanks having a bottom wall and sidewalls, and at least one hollow pillar supporting the higher of said tanks above and in spaced relationship relative to the lower of said tanks, said



bottom wall of the higher of said tanks having an aperture and said top wall of the lower of said tanks having an aperture, said apertures placing said upper chamber and said lower chamber in communication through said hollow pillar.

---

**4,147,132**
**PIG NURSERY FEEDER**
**Carl V. Gilst, Goshen, Ind., assignor to AG Best, Inc., Syracuse, Ind.**
**Filed Jan. 26, 1977, Ser. No. 762,515**
**Int. Cl.[2] A01K *5/00***
**U.S. Cl. 119—53** **18 Claims**



1. Animal feeder apparatus comprising:
an upper feeder portion for storing animal feed, said upper feeder portion being bounded by upper side wall means,
an intermediate feeder portion disposed immediately below said upper feeder portion, said intermediate feeder portion being bounded by intermediate side wall means connected to the bottom of the upper side wall means, said intermediate side wall means diverging laterally outwardly in the downward direction with respect to a vertical plane through the feeder apparatus so that said intermediate portion exhibits an increasing cross-sectional area in the downward direction to form an expanded throat for promoting free flow of said feed therethrough,
a lower feeder portion communicating directly with feed opening means accommodating consumption of the feed by animals with an automatic gravity aided passage of feed from said upper portion through said intermediate portion to said lower portion and said feed opening means in response to consumption of the feed by the animals, said lower feeder portion being bounded at the bottom by bottom wall means which extend laterally outwardly in the downward direction with respect to said vertical plane, said bottom wall means and said intermediate side wall means being disposed to face one another to form a feed passage therebetween upstream of the feed opening means, which feed passage extends laterally outwardly in the downward direction with respect to the vertical plane, said lower feeder portion being bounded at the sides by

lower converging side wall means connected with said intermediate side wall means and by movable slide member means mounted to slide along said lower side wall means, said feed opening means being formed between the bottom wall means and the bottom of said slide member means,

and feed opening adjustment means for adjustably moving the slide member means to adjust the size of the feed opening means.

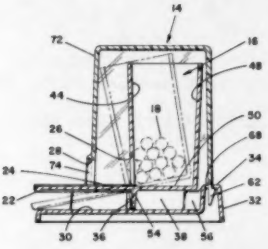
---

**4,147,133**

## DISPENSER DEVICE FOR SMALL ANIMAL FOOD OR THE LIKE

**John A. Molnar, Valley Cottage, N.Y.; James B. Stewart, Randolph Township, Morris County, and Sheldon P. Schmidt, Paramus, both of N.J., assignors to Mattel, Inc., Hawthorne, Calif.**

**Filed Aug. 8, 1977, Ser. No. 822,413**
**Int. Cl.[2] A01K** *5/00*
**U.S. Cl. 119—55** **11 Claims**




1. In a dispenser for small animal food items or the like, the combination comprising:

a base member having a generally planar surface and wall means formed in said planar surface to define a trough;

at least one hopper member having a front wall, two sidewalls, a back wall and a bottom, said front wall having an opening therein adjacent said bottom;

a depressor member formed integral with said hopper member and having a surface generally co-planar with said bottom;

pivot means engaging said planar surface within said trough for tiltably supporting said hopper member on said base member, said hopper member being tilted by actuation of said depressor member to permit said items to pass down the thus-inclined depressor member through said opening in said hopper member; and

cover means releasably secured to said base member for enclosing said at least one hopper member, said cover means having cutout means in alignment with said depressor member and in alignment with said opening for passage of said food items therethrough.

---

**4,147,134**

## BOILER HAVING A HOT GAS GENERATOR FOR BURNING LIQUID OR GASEOUS FUELS

**Alfred Vogt, Schaan, and Wolfgang Kunkel, Triesen, both of Fed. Rep. of Germany, assignors to Interliz Anstalt, Vaduz, Liechtenstein**

**Filed Nov. 4, 1977, Ser. No. 848,563**
**Claims priority, application Fed. Rep. of Germany, Nov. 5, 1976, 2650660**
**Int. Cl.[2] F22B** *9/12;* **F23J** *5/02;* **F23M** *9/00*
**U.S. Cl. 122—5** **6 Claims**

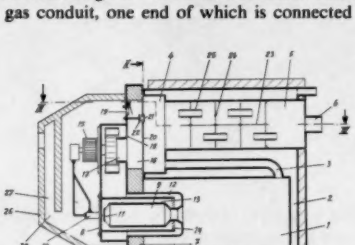
1. A boiler having a hot gas generator for burning liquid and gaseous fuels, which comprises:

a combustion chamber unit provided with a combustion chamber for receiving fuel and air for combustion and containing the combustion;

a compressor associated with said boiler for supplying the air for combustion into said combustion chamber unit, said compressor having an air intake;

a water cooled firebox associated with said boiler for receiving combustion gases from said combustion chamber;

a flue gas conduit, one end of which is connected to said



firebox for receiving combustion gases therefrom, and also to said compressor air intake for recirculating a regulatable amount of combustion gases back into said combustion chamber unit;

a flue gas vent connected to the other end of said flue gas conduit; and

means located in said flue gas conduit for providing a resistance to flow of combustion gases therein, said resistance being greater than the draft force in said flue gas vent.

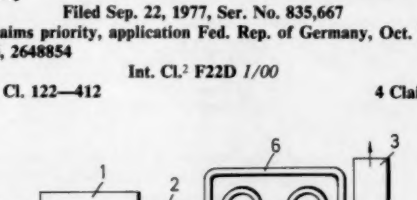
---

**4,147,135**

## DEVICE FOR REDUCING FLUE GAS HEAT LOSSES

**Donald Herbst, Marienplatz 11, 1 Berlin 45, Fed. Rep. of Germany**

**Filed Sep. 22, 1977, Ser. No. 835,667**
**Claims priority, application Fed. Rep. of Germany, Oct. 25, 1976, 2648854**
**Int. Cl.[2] F22D** *1/00*
**U.S. Cl. 122—412** **4 Claims**




1. A device for the reduction of the heat losses due to flue gases in boilers having a flue and which are operated with oil or gas comprising:

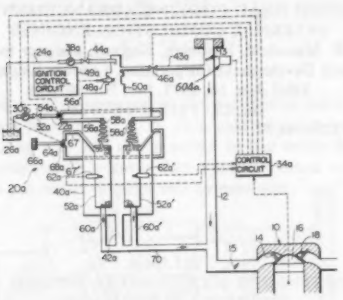
a heat exchanger located in said boiler flue, said heat exchanger serving for the reduction of the temperature of the flue gases and through which water from the boiler is passed; and

a heat pipe having opposite, longitudinally spaced ends in said flue, said heat exchanger being positioned between said heat pipe ends and wherein the warm side of the heat tube is located between the boiler and the heat exchanger.

## 4,147,136
## FUEL REFORMING SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

Masaaki Noguchi, Nagoya; Tsuchio Bunda, Okazaki, and Taro Tanaka, Chiryu, all of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Filed Dec. 3, 1975, Ser. No. 637,413
Claims priority, application Japan, Dec. 6, 1974, 49-140725; Jan. 13, 1975, 50-6726; Jun. 11, 1975, 50-71121
Int. Cl.[2] F02B *43/08*
U.S. Cl. 123—3 17 Claims




1. A fuel reforming system for an internal combustion engine, which includes a combustion chamber, an air cleaner, and an intake pipe operatively communicating said air cleaner with said combustion chamber via an intake valve for feeding air therethrough, comprising:

a burning chamber for burning a mixture of fuel and air therein to thereby produce a combustion gas of a high temperature;

a first air conduit operatively communicating said intake pipe with said burning chamber for supplying air thereto from said air cleaner;

a fuel tank for storing a hydrocarbon fuel;

a first fuel conduit operatively communicating said fuel tank with said burning chamber for supplying the fuel thereto;

igniting means disposed in said burning chamber for igniting and burning the mixture of air and fuel respectively supplied from said first air and fuel conduits;

a heat exchanging chamber communicated with said burning chamber at its upstream end and also communicated with said intake pipe at its downstream end for allowing said combustion gas to flow from said burning chamber to said intake pipe through said heat exchanging chamber;

fuel reforming reactor means disposed in said heat exchanging chamber and having a catalyst therein for reforming a fuel into a reformed gaseous mixture including hydrogen, said fuel reforming reactor means being heated by said combustion gas flowing through said heat exchanging chamber, and said fuel reforming reactor means being communicated with said intake pipe for supplying the reformed gaseous mixture to said engine;

a second fuel conduit operatively communicating said fuel tank with said fuel reforming reactor means through a fuel control valve for supplying a fuel thereto for causing the catalytic reforming reactor of said fuel in said fuel reforming reactor means;

a control circuit for periodically actuating said fuel control valve to open said second fuel conduit; and

a second air conduit operatively communicated with said fuel reforming reactor means through an air control valve for supplying air thereto;

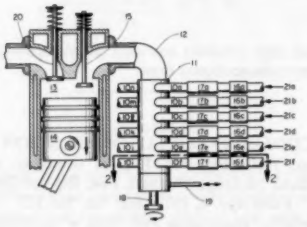
said control circuit also periodically actuating said air control valve to open said second air conduit during a time when said second fuel conduit is closed by said control circuit, whereby when said fuel reforming reactor means is supplied with the air, a combustion reaction is caused between the air and carbon produced by said reforming reaction and deposited on the surface of said catalyst to thereby remove said carbon therefrom.

---

## 4,147,137
## ENGINE INTAKE STRATIFIER

Joseph C. Firey, 1554 NE. 95th St., Seattle, Wash. 98115

Continuation of Ser. No. 284425, Aug. 28, 1972, abandoned. This application Nov. 10, 1976, Ser. No. 740,481
Int. Cl.[2] F02b *19/10, 19/16*
U.S. Cl. 123—32 ST 44 Claims



1. The combination of an internal combustion engine, adapted for operation with intake air fuel mixtures, wherein the improvement comprises replacing the fuel supply, torque control, and air fuel mixing equipment of said internal combustion engine with apparatus comprising;

means for creating differing gaseous air fuel mixtures in each of a plurality of separate air fuel channels, the values of the ratio of fuel to air lying between infinity and zero and preferably between 20 percent richer in fuel than the chemically correct fuel to air ratio and a fuel to air ratio of zero;

means for sequentially connecting the intake pipe of the engine to said separate air fuel channels one set of channels at a time, in a plurality of sequence of said connectings to sets of channels for each engine cycle, each such connecting in said sequence differing from the preceding connecting so that, within the multiregional stratified air fuel mixture thusly created in the intake pipe of the engine, any two adjacent air fuel mixture regions therein come from different air fuel mixture channels;

means for changing said sequence of connectings, while the engine is running, so that said multiregional stratified air fuel mixture in the engine intake pipe is changed.

---

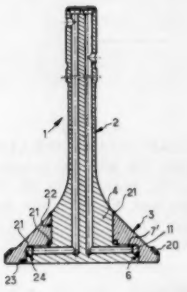
## 4,147,138
## MUSHROOM-TYPE VALVE COOLED BY COOLING FLUID CIRCULATION

Albert Haug, Montmorency, France, assignor to Societe d'Etudes de Machines Thermiques, Saint-Denis, France

Filed Aug. 30, 1976, Ser. No. 718,762
Claims priority, application France, Oct. 30, 1975, 75 33197
Int. Cl.[2] F01P *3/14*
U.S. Cl. 123—41.41 19 Claims

1. A mushroom-type valve for an internal combustion engine comprising an assembled stem and annular head joined together along a common interface therebetween, the valve

having a plurality of non-concentric fluid circulation conduits interconnected together by an annular passage formed in the



annular head, said conduits and said annular passage being of uniform free cross-sectional area.

---

**4,147,139**

## LIQUID-COOLED INTERNAL COMBUSTION ENGINE

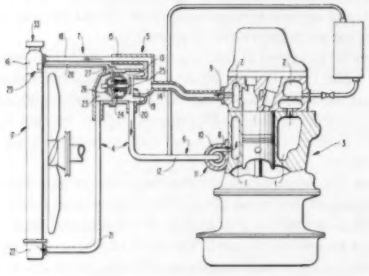
**Jürgen Hass, Weinstadt, Fed. Rep. of Germany, assignor to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany**

**Filed Apr. 6, 1977, Ser. No. 785,227**

**Claims priority, application Fed. Rep. of Germany, Apr. 10, 1976, 2615728**

**Int. Cl.**[2] **F01P** *11/02, 11/04, 7/16*

**U.S. Cl. 123—41.54** **8 Claims**



1. A liquid-cooled internal combustion engine having a cooling medium outlet and a control of the cooling medium temperature of its cooling medium circulation, comprising a thermostatically operating mixing valve means which includes a mixing chamber means, a circulating pump having a suction connection, the suction connection of the circulating pump being interconnected into the cooling medium circulation in substantially open communication with the mixing chamber means, radiator means having an inlet, an outlet, and inlet and return lines for the cooling medium, a return chamber means operatively connected by way of the radiator return line with the radiator outlet of the radiator means, a return valve means for closing off the return chamber means with respect to the mixing chamber means, and a by-pass channel means operatively connected with the cooling medium outlet of the internal combustion engine and by-pass control valve means for closing off the by-pass channel means with respect to the mixing chamber means, said mixing valve means having a cooling medium outlet connected by way of the radiator inlet line with the cooling medium inlet of the radiator means, characterized in that a first vent connection means and an auxiliary chamber means are provided, said first vent connection means interconnecting the return chamber with said auxiliary chamber means, said auxiliary chamber means being associated with the circulation pump in a manner enabling said auxiliary chamber means to be fed by the circulating pump with cooling medium so as to form a liquid seal means in said auxiliary chamber means for preventing air from being drawn into the cooling system by the circulating pump upon opening of the return control valve means due to the maintenance of said liquid seal being independent of the position of said return control valve means and in that the auxiliary chamber means includes a second vent connection means which is open to a geodetic high place in the cooling medium circulation and which serves for the air separation.

---

**4,147,140**

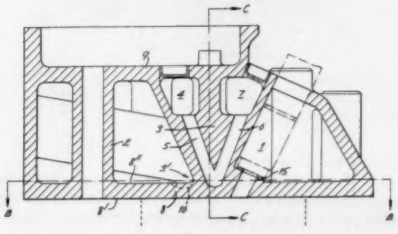
## CYLINDER HEAD COOLING ARRANGEMENT FOR INTERNAL COMBUSTION ENGINES

**Wilfred P. Mansfield, Eastleigh, England, assignor to National Research Development Corporation, London, England**

**Filed Jun. 16, 1977, Ser. No. 807,146**

**Int. Cl.**[2] **F01P** *3/14, 3/16*

**U.S. Cl. 123—41.77** **6 Claims**



1. A structural unit for an internal combustion engine comprising:

a deck defining a cylinder cover having an extending surface and a region within said surface less in area than said extending surface, said region having a sub-surface that is heated in use so as to require direct cooling to prevent overheating of said region;

a heat-conducting structure;

heat-conducting connection means between said deck region and said heat-conducting structure; and

fluid-flow cooling means associated with said heat-conducting structure, whereby to remove heat conducted to it through said heat-conducting connection means from said region of said unit, said fluid-flow cooling means providing the only direct cooling of said heat conducting structure so as to prevent overheating of said region, and in which the section through said connection means at the location between said connection means and said deck matches in shape and registers with said region requiring direct cooling to conduct heat from said region to said heat conducting structure, said region being under substantial influence from no other fluid flow cooling means.

---

**4,147,141**

## EXHAUST GAS RECIRCULATION SYSTEM IN AN INTERNAL COMBUSTION ENGINE

**Tetsuro Nagano, Susono, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan**

**Filed Nov. 7, 1977, Ser. No. 849,353**

**Claims priority, application Japan, Jul. 22, 1977, 52/87264**

**Int. Cl.**[2] **F02M** *25/06*

**U.S. Cl. 123—119 A** **4 Claims**

1. An EGR system in an internal combustion engine comprising:

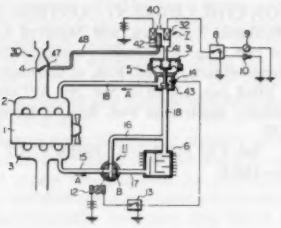
an EGR pipe which interconnects an exhaust pipe and an intake pipe of the engine;

an EGR valve mounted on said EGR pipe;

an EGR cooler mounted on said EGR pipe upstream of said EGR valve;

a by-pass pipe arranged parallel to said EGR cooler;

a thermosensor which detects the EGR gas temperature; and



a selection valve arranged at the connection point of said by-pass pipe to said EGR pipe, said selection valve co-operating with said thermosensor so that when the EGR gas temperature is lower than a predetermined value, the EGR gas passes through said by-pass pipe.

---

**4,147,142**

## FUEL MODIFICATION SYSTEM FOR INTERNAL COMBUSTION ENGINES

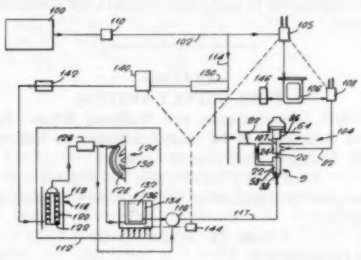
**Allan V. Little, deceased, late of Cheltenham, Australia, by Anna Little, administratrix, 2 Shadwell St., Cheltenham, Victoria, Australia, and Ronald A. Wilkinson, 11 Hutchison Ave., Beaumaris, Victoria, Australia (3193)**

**Filed Mar. 12, 1976, Ser. No. 666,207**

**Claims priority, application Australia, Mar. 14, 1975, 907/75**

**Int. Cl.[2] F02M *31/00***

**U.S. Cl. 123—133** **35 Claims**



1. An internal combustion engine having a fuel supply system; a fuel induction system; an exhaust system including an exhaust manifold and an exhaust discharge conduit; and means for modifying fuel supplied to the engine; said fuel modifying means comprising: a first chamber having an inlet and an outlet for passage of fluid hydrocarbon fuel therethrough; said first chamber having a tortuous, labyrinth path for the fuel flow from said inlet to said outlet; said first chamber being incorporated in said exhaust discharge conduit and being adapted for external heating by the exhaust in said exhaust discharge conduit whereby fuel received at said inlet as a liquid is thermally cracked during flow to said outlet; a second chamber having an inlet and an outlet; said second chamber inlet being in communication with said first chamber outlet for receiving fuel from said first chamber, said second chamber outlet being in communication with said fuel induction system for the supply of fuel thereto; said second chamber containing a cracking catalyst for hydrocarbon fuel; and said second chamber being mounted on the exterior of said exhaust manifold to thereby expose fuel in said second chamber to exhaust gas heat sufficient to effect catalytic cracking of the fuel.

**4,147,143**

## ENGINE ACCELERATION DETECTION APPARATUS

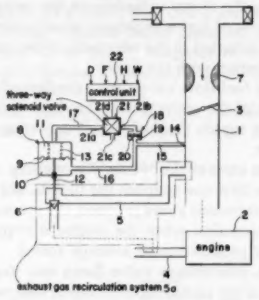
**Setsuo Harada, Hiroshima, Japan, assignor to Toyo Kogyo Co., Ltd., Aki, Japan**

**Filed Sep. 15, 1977, Ser. No. 833,704**

**Claims priority, application Japan, Sep. 20, 1976, 51-113461; Sep. 20, 1976, 51-113462; Nov. 10, 1976, 51-151304[U]**

**Int. Cl.[2] F02M *25/06***

**U.S. Cl. 123—119 A** **11 Claims**




1. An apparatus for detection of acceleration of an engine of an automotive vehicle comprising a diaphragm unit including a displaceable diaphragm which divides said unit into a first chamber which is connected directly to a pressure detection port located downstream of a throttle valve in a carburetor of said engine and a second chamber which is connected to said pressure detection port through a delay element comprising a restriction orifice and a check valve which is disposed in parallel to said restriction orifice and opens when pressure in said second chamber is higher than, and closes when pressure in said second chamber is lower than pressure at said pressure detection port, said diaphragm being displaced to different positions in accordance with difference between pressure in said first chamber and pressure in said second chamber, an actuation rod element which is connected to and moved to different positions in accordance with movement of said diaphragm, said actuation rod element controlling actuation of regulation means for adjustment of factors relating to operation of said engine,

a normally closed atmosphere connection means which may be opened to connect said second chamber of said diaphragm unit to an air source which is at or close to atmospheric pressure; and

control means receiving input indicative of operating conditions of said engine and causing said atmosphere connection means to open in particular said conditions.

---

**4,147,144**

## CARBURETION SYSTEM FOR INTERNAL COMBUSTION MOTOR

**Istvan Furucz, 3964 St. Denis St., Montreal, Quebec, Canada**

**Filed Aug. 11, 1977, Ser. No. 823,612**

**Claims priority, application Canada, Aug. 13, 1976, 259053**

**Int. Cl.[2] F02M *31/00***

**U.S. Cl. 123—122 A** **34 Claims**

1. A carburetion system for internal combustion motor, being provided with a carburetor operating in a characteristic manner of an injection system, said carburetor in its simplest aspect being provided with a single carburetion chamber and one fuel reservoir, the carburetion chamber being provided with means to control the admission of air, said carburetion system being characterized in that:

the carburetion chamber below means for controlling the admission of air is divided according to a predetermined dimension ratio thus forming two compartments which

are independent of one another, each having a different function but operating together to enable the carburetion;

the reservoir of the carburetor is fed by a fuel pump under constant pressure, through an adjustable pressure regulator, said pressure regulator being connected to control means enabling to vary the pressure of fuel inside said reservoir depending on the operating conditions and the general behaviour of the engine;

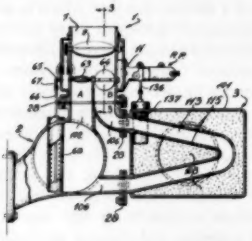
depending on a pressure established by the pressure regulator and independently of the fall in pressure which is exerted by the motor cylinders on the carburetion chamber, the flow of fuel is regulated by adjusting the opening of valves mounted in the reservoir of the carburetor or in communication with the latter;

two variable fuel flow valves feed the first of the two compartments of the carburetion chamber, said valves being adapted to supply the fuel for all operating conditions of the motor;

a mechanism ensures the successive opening of said valves, so that the first one supplies the fuel during idling and up to a predetermined average speed, the second valve entering into operation when the engine is required to rotate above said predetermined average speed;

a controlled, intermittent valve flows into the second compartment of the carburetion chamber, said valve supplying an excess of fuel when starting the engine or when it is required;

a mechanism automatically adjusts the opening of the means controlling the admission of air with respect to the opening of the variable fuel flow valves, in order that for a fixed pressure of fuel, said mechanism makes sure that the carburetion chamber produces a flow mixture with the same volume ratio of fuel and air for any stable operating conditions of the engine;



a heat exchanger connected downstream of said carburetor, said heat exchanger and said carburetor being separated by a high-performance thermic insulator, said heat exchanger comprising a body provided with a heat exchange duct, connecting said first compartment of the carburetion chamber to an admission system to the motor cylinders;

means bringing combustion gases around said heat exchange duct to heat the latter, in order that the fuel supplied by the variable fuel flow valves during its passage in said duct can be converted into vapour;

the body of said heat exchanger is unitary and removable in order to be easily removed to exchange or to carry a periodic cleaning;

an unheated passage connecting said second compartment of the carburetion chamber directly to the admission system of the motor cylinders;

said carburetion system being provided with control means to regulate the proportion of the quantities of air which pass through the heat exchange duct and in the direct passage to the admission system to the motor cylinders;

an automatically controlled mechanism adjusting the position and the action of said control means, depending on the temperature of the combustion mixture at the inlet to the motor cylinders.

---

**4,147,145**

## IGNITION COIL CURRENT CONTROL CIRCUIT

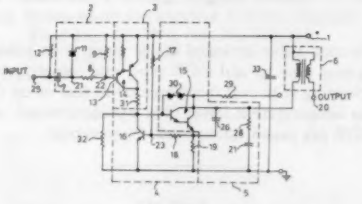
**Christoph Dömland, Wolfsburg, and Manfred Lotzmann, Gifhorn, all of Fed. Rep. of Germany, assignors to Volkswagenwerk Aktiengesellschaft, Fed. Rep. of Germany**

**Filed Jun. 18, 1976, Ser. No. 697,684**

**Claims priority, application Fed. Rep. of Germany, Jun. 21, 1975, 2527725**

**Int. Cl.[2] F02B *1/02*; H05B *37/02***

**U.S. Cl. 123—148 E** **6 Claims**




**1**. In a control circuit, usable with an ignition coil and a battery, for controlling current supplied to the coil by the battery, the improvement comprising:

means, responsive to voltage of the battery and responsive to said current, for developing a control signal, said control signal developing means including a passive voltage divider, connected across the battery and consisting of a plurality of resistors, at least one of which is circuit connected in series with the coil, and a transistor having a control electrode connected to said voltage divider, and

means responsive to said control signal, for controlling said current.

---

**4,147,146**

## FUEL SUPPLY SYSTEM

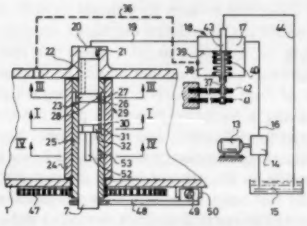
**Wolf Wessel, Oberriexingen, and Wolfgang Ripper, Stuttgart, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

**Filed Feb. 17, 1977, Ser. No. 769,495**

**Claims priority, application Fed. Rep. of Germany, Feb. 24, 1976, 2607366**

**Int. Cl.[2] F02M *39/02***

**U.S. Cl. 123—139 AW** **2 Claims**



**1**. A fuel supply system for an internal combustion engine, said engine including an intake manifold containing a throttle plate actuated at the discretion of the operator, said fuel supply system comprising:

an airflow metering device, located in said intake manifold upstream of said throttle plate and capable of pivoting motion about a shaft under the influence of air aspirated by the engine;

a fuel metering valve, formed by relatively movable parts of said airflow metering device and of said shaft;

a flat seat differential pressure valve, for maintaining a constant pressure drop across said fuel metering valve, said differential pressure valve having a spring and a movable diaphragm serving as the valve closing chamber, one side of said diaphragm being exposed to the fuel pressure upstream of the fuel metering valve and the other side of said diaphragm being exposed to the intake manifold pressure upstream of said airflow metering device and to the spring force; and

means for changing the differential pressure exerted by said differential pressure valve in dependence on engine variables, said means for changing the differential pressure exerted by said differential pressure valve comprising: first and second bimetallic members; and means connecting said bimetallic members to the other side of said diaphragm for exerting closing forces against said diaphragm below a predetermined engine temperature.

---

**4,147,147**

## INTERNAL COMBUSTION ENGINE IGNITION SYSTEM

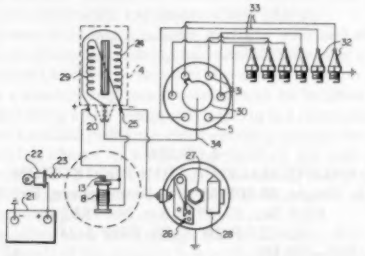
**Francisco E. Ortiz, and Federico E. Vidales, both of Tajin 698, Mexico City 13, Mexico**

**Filed Nov. 28, 1977, Ser. No. 855,189**

**Claims priority, application Mexico, Nov. 29, 1976, 167219**

**Int. Cl.[2] F02P *3/02***

**U.S. Cl. 123—148 DS** **1 Claim**




1. In an ignition system for an internal combustion engine of the type having a source of electrical power, an ignition switch connected to the power source, an ignition coil having primary and secondary windings, a distributor having a cam and cam-operated breaker points, a distributor arm and contacts, a plurality of spark plugs, one connected to each of said distributor contacts, the distributor arm being connected to the secondary winding of said coil and operative to sequentially complete a circuit to each of said contacts, said breaker points being connected in series circuit relationship with said primary winding, said source and said ignition switch, the improvement comprising

a magnetic pulser having an energizing winding, a set of normally closed contacts, a movable member carrying one of said contacts and movable to separate said one of said contacts away from the other thereof upon energization of said winding, and a spring urging said movable member to the position in which said contacts are closed,

said set of contacts being connected in series circuit relationship between said primary winding of said coil and said ignition switch,

said energizing winding being connected in parallel circuit relationship with said primary winding of said coil to obtain a reduction in the resistance and inductance of the circuit including both of said windings and application of the same voltage to both of said windings and a fast and complete saturation of the primary winding even at high engine speeds,

said spring being selected to have a force sufficient to resist opening of said contact set until the breaker points of said distributor are opened by said distributor cam, whereby the increase of current in said pulser energizing winding and primary winding is stopped upon opening of said breaker points and contact set so that the primary winding and pulser are operated at the same phase and frequency, said windings providing, by induction, a high current flow in the secondary winding of said coil and to said spark plugs.

---

**4,147,148**

## FUEL CONTROL APPARATUS FOR A DIESEL ENGINE

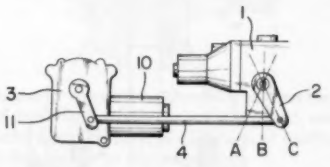
**Masami Ito, Toyota; Tsutomu Saito, Hekinan, and Yoshiyuki Morita, Kariya, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota and Nippon Denso Company Limited, Kariya, both of, Japan**

**Filed Sep. 19, 1977, Ser. No. 834,566**

**Claims priority, application Japan, May 19, 1977, 52-63313[U]**

**Int. Cl.[2] F02N *17/00***

**U.S. Cl. 123—179 L** **6 Claims**




1. A fuel control apparatus for a diesel engine comprising

a motor having a shaft which rotates in one direction,

a link having one end rotated by said motor shaft and the other end connected with an arm,

a fuel control lever which moves between a fuel-shut-off position and a starting-fuel-increasing position in response to the motion of said rotating shaft connected with said arm,

a key switch,

a pattern switch which rotates co-angularly with rotation of said motor shaft,

means for providing an indication of whether said engine is rotating or at reast, and

a control circuit responsive to a first angular position of said pattern switch and the movement of said key switch to a start position for starting the motor thereby moving said fuel control lever from said fuel-shut-off position to said starting-fuel-increasing position and angularly moving said pattern switch until said pattern switch reaches a second angular position, said control circuit being responsive to said pattern switch reaching said second angular position for stopping said motor, said second angular position of said pattern switch corresponding to the starting-fuel-increasing position of said fuel control lever, said control circuit being further responsive to the movement of said key switch from said start position to an operative position and to an indication that said engine is rotating provided by said means for providing for restarting said motor, thereby rotating said pattern switch until said pattern switch reaches a third angular position and said fuel control lever is correspondingly in a normal fuel supply position, said control circuit being responsive to said pattern switch reaching said third angular position for stopping said motor, said control circuit being further responsive to movement of said key switch from an operating to a cut-off position for restarting said motor, said motor rotating said pattern switch and moving said fuel control lever toward said fuel shut off position until said pattern switch reaches first angular position corresponding to said fuel control lever being in said shut-off position, said control circuit being responsive to said pattern switch

reaching said first angular position for stopping said motor.

---

**4,147,149**

## EXHAUST VALVE FOR A RECIPROCATING INTERNAL COMBUSTION ENGINE

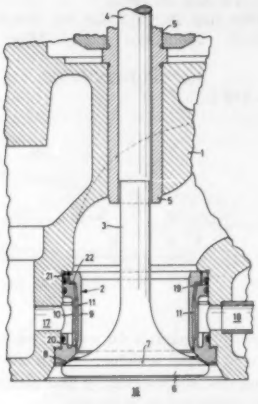
**Simon Andrea, Attikon, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland**

**Filed May 16, 1977, Ser. No. 797,237**

**Claims priority, application Switzerland, May 24, 1976, 6506/76**

**Int. Cl.[2] F01L *3/00;* F01P *3/14***

**U.S. Cl. 123—188 S** **4 Claims**



1. In an exhaust for mounting in a cylinder head of a reciprocating internal combustion engine, the combination comprising

a movable valve body having a sealing surface thereon; and

a sleeve-like member composed of two coaxial tubular parts, an outer one of said parts having a flange at each end for securement in the cylinder head, one of said flanges defining a valve seat surface for matingly receiving said sealing surface of said valve body in seal-tight relation and at least one chamber adjacent said valve seat surface for passage of a coolant to cool said valve seat surface and an outside surface of said outer part, the inner one of said parts having an inner surface extending axially of said member for guiding a flow of gases through said member and defining at least one narrow closed air gap extending axially between said parts between said valve seat surface and said inner surface and outside a cooling zone of said valve seat surface to impede heat exchange between the flow of gases and the coolant.

---

**4,147,150**

## INTERNAL COMBUSTION ENGINE WITH AN AUXILIARY COMBUSTION CHAMBER

**Masato Yokota, and Tetsuji Katayama, both of Susono, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan**

**Filed May 16, 1977, Ser. No. 797,360**

**Claims priority, application Japan, Dec. 21, 1976, 51-154496**

**Int. Cl.[2] F02B *19/18, 23/08***

**U.S. Cl. 123—191 S** **12 Claims**

1. An internal combustion engine comprising:

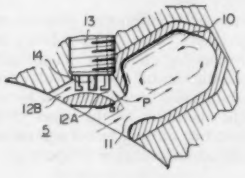
a cylinder block having a cylinder bore therein;

a cylinder head mounted on said cylinder block and having therein a cavity defining an auxiliary combustion chamber;

a piston reciprocally movable in said cylinder bore, said piston and said cylinder head defining a main combustion chamber therebetween;

an intake valve movably mounted on said cylinder head for opening an intake passage for introducing a combustible mixture into said main combustion chamber;

a first connecting passage in said cylinder head and directly fluidly communicating said auxiliary combustion chamber with said main combustion chamber;



a second connecting passage in said cylinder head, said second passage having a first end opening directly transversely into said first passage between the ends thereof and a second opposite end opening directly into said main combustion chamber; and

a spark plug having a spark gap in said second passage.

---

**4,147,151**

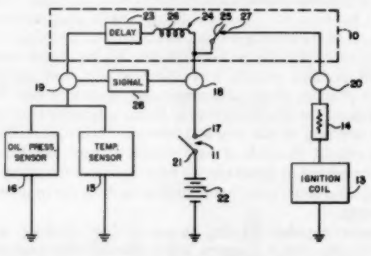
## ENGINE MALFUNCTION PROTECTION

**George L. Wright, 28 Hillside Dr., Downingtown, Pa. 19335**

**Filed Dec. 27, 1976, Ser. No. 754,316**

**Int. Cl.[2] F02B *77/08;* F01P *5/14***

**U.S. Cl. 123—198 DC** **12 Claims**




1. Apparatus for protecting an engine from malfunctioning, comprising:

a unitary module having a single enclosure from which protrude only three functionally distinct electrical terminals,

the enclosure containing electrically interacting components consisting only of

a relay having normally closed switch contacts and a coil which responds to energization to open the contacts,

a delay circuit connected to the coil for delaying the energization of the coil,

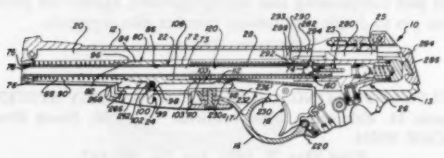
the coil and delay circuit being connected between a first and second of the three terminals, and

the contacts being connected between the first and the third of the three terminals.

## 4,147,152
## PROJECTILE PROPULSION AND CONTROL IN A GAS-POWERED GUN

Earl L. Fischer, Bentonville, and Lee F. Garmon, Jr., Rogers, both of Ark., assignors to Victor United, Inc., Chicago, Ill.

Filed Jun. 3, 1977, Ser. No. 803,353
Int. Cl.[2] F41B 11/06
U.S. Cl. 124—76 26 Claims



1. In a gas-powered gun having a gas expansion space defined between a forwardly disposed projectile and a rearwardly disposed control valve with respect to the direction of projectile travel out of the gun, and further having a barrel for the projectile and a rearwardly movable actuator in said space for momentarily unseating said valve to admit a sudden projectile-propelling charge of gas into said space, the improvement comprising:

means other than said barrel for moving the projectile rearwardly with said actuator during said movement of the latter whereby to decrease the dimensions of said space and thereby reduce the amount of energy loss due to wasted volumetric expansion of said charge,

said means including a retainer movable with said actuator and structure for releasing said retainer only after a predetermined amount of rearward movement by the projectile.

19. In a gas-powered gun provided with an actuator that is spring-driven by a first compression spring in a rearward direction from a cocked position a valve-opening position for releasing a sudden charge of projectile-propelling gas and is then spring-returned by a second compression spring in the opposite forward direction toward said cocked position, the improvement comprising:

means other than said springs for terminating said return movement of the actuator before the actuator can re-compress said first spring and at an intermediate position substantially free from spring force in either of said directions whereby to avoid additional, unintended valve openings caused by rebounding oscillations of the actuator the forwardmost position of said actuator for said return movement being rearward of said cocked position and being said intermediate position.

---

## 4,147,153
## FIREPLACE AIR CIRCULATION AND DRAFT CONTROL

Carrol E. Buckner, Weaverville, N.C., assignor to Buck Stove Marketing, Corporation, Asheville, N.C.

Continuation-in-part of Ser. No. 693,805, Jun. 7, 1976, Pat. No. 4,092,976. This application Aug. 26, 1977, Ser. No. 828,107
Int. Cl.[2] F24C 1/14
U.S. Cl. 126—63 33 Claims

1. In a fireplace having a fire box with an opening in a front wall and, forced air channels along the two side walls with a pair of vents on the front wall adjacent said opening, and means for forceably introducing air into said forced air channels, the improvement comprising:

said vents being elongated vertical vents extending along a substantial portion of the length of said opening; and

first means cooperating with said vertical vents for directing the air exiting said vents to converge in front of said opening; and

said air introducing means drawing air from a volume in front of the fireplace exterior the volume defined in front of said opening by said convergent exiting air.

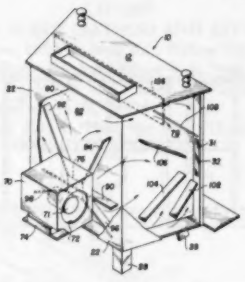
26. A free-standing forced air heater comprising:

a fire box;

forced air channel along the exterior of at least the back of said firebox;

inlet means in the rear portion of said forced air channel spaced from the bottom of said firebox for receiving air from above and around the heater;

outlet means in the front of said forced air channel for providing forced hot air adjacent the bottom front of said heater;



blower means for drawing air into the inlet from the top and sides of the room in which the heater is placed, and exiting said outlet along the floor of said room to uniformly mix the air temperature in said room;

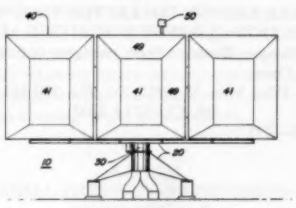
said forced air channel including a portion along each side of said firebox and said outlet means including two vents on each side of said firebox directing forced air downward.

---

## 4,147,154
## SOLAR HEAT TRACKING AND COLLECTING APPARATUS

Robert E. Lewandowski, c/o Mayfield Stage, Boise, Id. 83707

Filed Jul. 8, 1977, Ser. No. 813,940
Int. Cl.[2] F24J 3/02
U.S. Cl. 126—270 4 Claims



1. Solar heat tracking and collecting apparatus comprising:

a frame;

frame rotation means engaging said frame and operable to rotate said frame in a horizontal and vertical direction;

at least one solar heat concentrator mounted on said frame, said concentrator having a substantially rectangular flat collector plate and two pair of oppositely disposed light reflective side walls bounding said collector plate, the side walls in a converging relationship one to the other;

a solar energy sensing means disposed on said frame and operable to control said frame rotation means; and

a tri-phase solar mode sensor mounted on said frame, said mode sensor in one phase opeerable to enable and disable said solar energy sensing means from controlling said frame rotation means, in a second phase adapted to disable said solar energy sensing means and adapted to operate a timer for controlling said frame rotation means, and in a third phase operable to control said frame rotation means

to reset the frame with mounted solar heat concentrator in a substantially easterly direction.

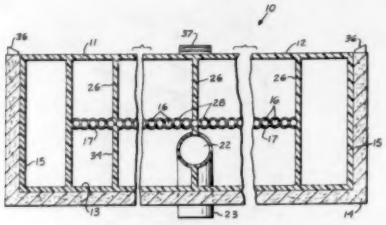
---

**4,147,155**

## DEVICE FOR COLLECTING SOLAR ENERGY

**Frederick G. Krafft, 2975 Fox Hollow Rd., Springfield, Ohio 45502**

**Filed Jan. 19, 1977, Ser. No. 760,764**
**Int. Cl.[2] F24J 3/02**
**U.S. Cl. 126—271** **4 Claims**



1. In an energy collector for collecting solar energy; a hollow body formed of a material which is substantially transparent to solar heat radiation, said body having a top wall, a bottom wall in spaced, parallel relation to said top wall, and a peripheral wall extending between said top and bottom walls, a web in said body disposed between said top and bottom walls in substantially equally spaced relation thereto and connected to said peripheral wall, said web having side by side passages formed therein in the plane thereof, reinforcing ribs parallel with said passages extending between said web and each of said top and bottom walls of said body, said ribs defining insulating spaces in said body on opposite sides of said web, at least said web with said passages therein and said ribs comprising an integral extruded element, and manifolds connected respectively to opposite ends of said passages for supplying fluid thereto and withdrawing fluid therefrom.

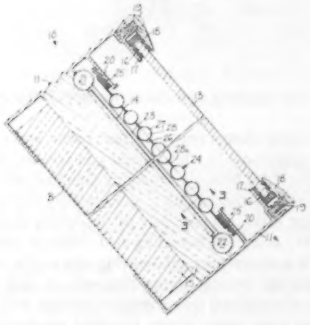
---

**4,147,156**

## SOLAR ENERGY COLLECTOR HAVING A CONVECTION CURRENT INHIBITING MEMBER

**Thomas P. Hopper, Durham, Conn., assignor to Sunworks, Inc., Guilford, Conn.**

**Filed Mar. 23, 1977, Ser. No. 780,441**
**Int. Cl.[2] F24J 3/02**
**U.S. Cl. 126—271** **6 Claims**



1. In a solar energy collector having a transparent cover member, means defining a housing including end and side walls, and a solar energy absorber therein beneath a transparent cover member, said housing adapted to be operatively positioned with one end wall higher than the other, the improvement comprising means for inhibiting convection currents between the absorber and cover member, said means comprising a plurality of pins attached to said housing, an elongated tubular gas-containing member of transparent material of good light transmissivity, said tubular member being wrapped in a serpentine manner over the absorber around said pins, with adjacent horizontally extending turns in essentially parallel contact, and at least one member juxtaposed one of said pins compressing said tubular member against the proximate pin to divide said tubular member into segments.

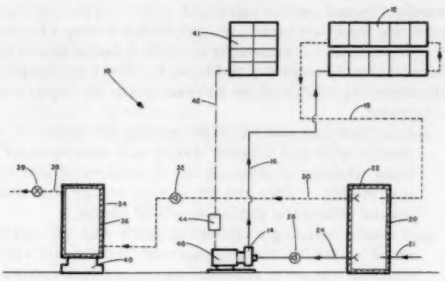
---

**4,147,157**

## SELF-SUPPORTING ACTIVE SOLAR ENERGY SYSTEM

**Ramiz H. Zakhariya, 2400 McBride La., #50, Santa Rosa, Calif. 95401**

**Filed May 25, 1977, Ser. No. 800,413**
**Int. Cl.[2] F24J 3/02**
**U.S. Cl. 126—271** **2 Claims**



1. In an active solar energy system comprising:
an array of solar collectors;
intake and transfer fluid ducts connected to said collector array;
a source of fluid;
a pumping device in said intake duct;
an inlet line for delivering a fluid from the source thereof to said pumping device;
an electric motor conditioned to drive said pumping device; and
a storage tank;
said transfer duct being adapted to conduct fluid to said storage tank;
the improvement comprising;
a solar-electric power transducer system exposed to sunlight when available;
said transducer system including solar-electric transducers in size and number to generate electricity sufficient to energize and drive said motor;
electric conductors connected to deliver an electric current from said power transducers system to said motor; and
a mixer vessel connected into said transfer duct and said inlet line upstream of said pumping device, whereby fluid from said collector array and said source will be mixed.

---

**4,147,158**

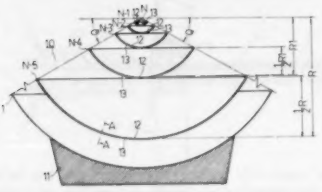
## MULTI-LAYERED SOLAR ENERGY COLLECTOR

**Chang Chieh-Tsung, No. 6, Ping-An Rd., Chao-Chou Chen, Ping-Tong Hsien, Taiwan, assignor to Chang Chieh-Tsung, Taiwan**

**Filed Jun. 29, 1977, Ser. No. 811,272**
**Claims priority, application Taiwan, May 24, 1977, 6610927**
**Int. Cl.[2] F24J 3/02**
**U.S. Cl. 126—271** **4 Claims**

1. A multi-layered solar energy collector assembly comprising, a plurality of concentric curved heat collectors arranged in an assembly radially spaced from each other in a vertical

direction, all of the reflectors except an uppermost collector each having a convex centripetal reflector face for receiving light rays incident thereon, and each having a convex heat-absorbing face confronting the convex centripetal reflector face of the next adjacent collector to receive and absorb scattered reflected light rays therefrom, each reflector face and the corresponding heat-absorbing face to which it reflects light rays being spaced half the distance of the radius of the reflector face next adjacent and confronting the related heat-absorbing face, and means maintaining the collectors spaced concentrically.



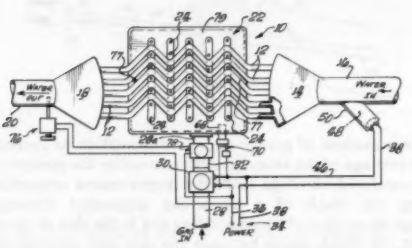
---

**4,147,159**

## TEMPERATURE CONTROLLED INSTANTANEOUS WATER HEATING APPARATUS

**Waldemar S. Thorwaldson, 2332 W. Peck Rd., Whittier, Calif. 90601**

**Filed Mar. 18, 1977, Ser. No. 779,133**
**Int. Cl.[2] F24H *1/14***
**U.S. Cl. 126—351** **9 Claims**



1. Instantaneous automatic water heating apparatus comprising:

a heat exchanger including a water heating tube system comprising a plurality of small tubes;

a cold water supply conduit to said water heating tube system for supplying thereto water to be heated;

a hot water conduit connected to said water heating tube system for reception of heated water therefrom;

said small tubes having substantially the same total flow capacity as the respective cold water supply conduit and the hot water conduit;

a gas burner beneath said tube system for heating water flowing through said tube system;

a gas supply conduit for said burner;

a normally closed primary gas control valve in said gas supply conduit for controlling the supply of gas to said burner;

an ignition device for igniting gas from the burner;

a secondary gas valve for controlling the flow of gas to the burner, said secondary valve being in series with the normally closed primary gas control valve;

thermostatic control means for fully opening said secondary gas control valve upon sensing a temperature and closing said secondary gas control valve to said partly opened position when the temperature sensed is above said predetermined temperature and said primary gas control valve is open;

electric circuits for said igniter device, secondary gas control valve, and the thermostatic means;

and switch means controlled by pressure in one of said water conduits for controlling the circuits to said igniter device, and opening said primary gas control valve and energizing the thermostatic means.

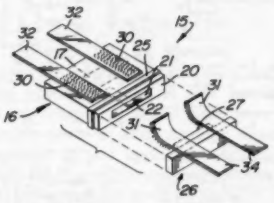
---

**4,147,160**

## FOALING ALERT METHOD AND APPARATUS

**Harold B. Aranow, 169 Windmill Rd., Willow Grove, Pa. 19090; Joseph P. Gyuraki, English Village Apts., Apt. C4, Bldg. 19, North Wales, Pa. 19454, and Robert E. Warenius, 1160 Roberts Rd., Warminster, Pa. 18974**

**Filed Jul. 15, 1977, Ser. No. 815,993**
**Int. Cl.[2] A61B *5/10***
**U.S. Cl. 128—2 S** **8 Claims**



1. A foaling alert device comprising a housing, a miniature wireless transmitter in said housing, normally closed switch means carried by said housing connected to said transmitter for activating and deactivating the latter, a switch operator movable toward said housing into switch opening engagement with said switch means and away from said housing out of engagement with said switch means to close the latter, attachment means connected to each of said housing and switch operator for attaching the same to respective sides of the female genital cavity, and separable retaining means secured to each of said housing and switch operator and releasably connected together to releasably retain said housing and switch operator toward each other in said switch opening engagement, for release of said retaining means and movement of said housing and switch operator away from each other to switch closing position upon opening of the genital cavity.

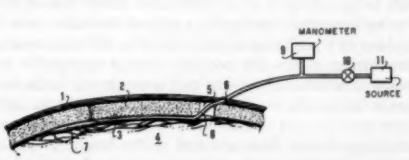
---

**4,147,161**

## INTRACRANIAL PRESSURE MONITORING METHOD AND SYSTEM

**Jun Ikebe; Yoriaki Kumagai; Kintomo Takakura, all of Tokyo, and Michio Ohta, Yokohama, all of Japan, assignors to Clinical Engineering Laboratory Limited, Tokyo, Japan**

**Filed Aug. 25, 1977, Ser. No. 827,740**
**Claims priority, application Japan, Aug. 27, 1976, 51-102399**
**Int. Cl.[2] A61B *5/00***
**U.S. Cl. 128—2 R** **6 Claims**




1. System for measuring intracranial pressure comprising a pouch consisting of a soft material which is non-elastic within the range of intracranial pressure, said pouch being

of a size so as to allow its insertion between the skull and the cerebrum,

said pouch being filled with a liquid for detecting the intracranial pressure,

means for insuring no inflow and outflow displacement of the liquid in the pouch, and

means for measuring the pressure of the liquid in said pouch, thereby detecting the intracranial pressure.

---

**4,147,162**

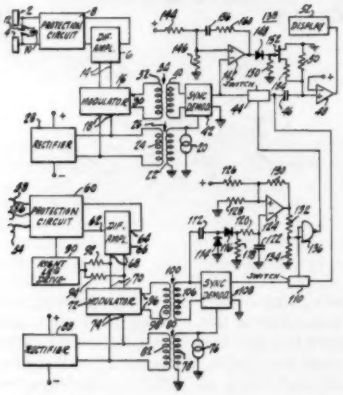
**DEFIBRILLATOR MONITOR BASELINE CONTROL**

**Ronald D. Gatzke, Lexington, Mass., assignor to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Jun. 10, 1977, Ser. No. 805,550**

**Int. Cl.[2] A61R *5/04***

**U.S. Cl. 128—2.06 B** **2 Claims**




1. Apparatus for use with a defibrillator monitor, comprising the combination of

a pair of electrodes for application to a patient's body so as to derive cardiographic signals therefrom,

an amplifier having an input and an output, and

means coupled to said electrodes for increasing the attenuation of low frequency energy passing through said amplifier for a predetermined interval following the occurrence of a signal that is in excess of a predetermined amplitude and which is derived from said electrodes prior to its application to the input of said means for increasing the attenuation of low frequency energy.

---

**4,147,163**

**MEDICAL INSTRUMENT AND HANDLE ASSEMBLY**

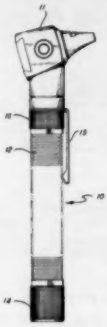
**Richard W. Newman, and John D. Connors, both of Auburn, N.Y., assignors to Welch Allyn, Inc., Skaneateles Falls, N.Y.**

**Filed Sep. 6, 1977, Ser. No. 831,058**

**Int. Cl.[2] A61B *1/22*; H01M *10/44*; F21L *9/00***

**U.S. Cl. 128—9** **10 Claims**

1. A battery handle for a medical diagnostic instrument, the handle being arranged to accommodate either non-rechargeable or rechargeable type cells, a pair of the latter cells being assembled in a pack that is dimensionally different than a pair of the former, a movable contact member engageable with a terminal of whichever type of cell is employed in the handle, means in the handle to complete a circuit between the cells and a light source, said last-named means including means for conducting current from one end of the handle to the other, current conducting means forming a part of the recharging circuit for the rechargeable cells, said last-named means being insulated from the handle current conducting means, the movable contact members when engaging the terminal of a non-rechargeable cell being position so as to contact the handle current conducting means, the movable contact member when engaging the terminal of a rechargeable cell being positioned



so as to contact the recharging circuit current conducting means whereby the cell can be recharged.

---

**4,147,164**

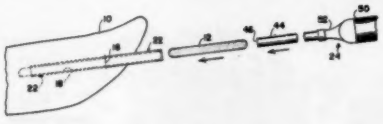
**METHOD OF PERFORMING IMPLANTATIONS IN A CANINE EAR OR THE LIKE FOR CORRECTIONAL PURPOSES**

**Charles A. Behney, Box 4137, Bisbee, Ariz. 85603**

**Filed Feb. 14, 1977, Ser. No. 768,101**

**Int. Cl.[2] A61D *1/00*; A61F *1/24***

**U.S. Cl. 128—76 R** **11 Claims**



1. In a method of performing an implantation to correct a faulty carriage of the animal ear occasioned by the presence of a skin-enclosed cartilage fault, the improvement comprising: forcing the shank of a trocar-like implement forwardly through an incision of corresponding size in the skin of the ear, so that the shank passes between the skin and cartilage into bridging relationship with respect to the cartilage fault, providing a cannula-like sheath around said shank and between the skin and cartilage in bridging relationship with respect to the cartilage fault, then withdrawing the shank endwise and rearwardly completely from the sheath, thus leaving the sheath at least partially embedded in the ear in said bridging relationship, then inserting an elongated ear implant endwise into the thus-embedded sheath, then utilizing the shank portion of an elongated thrust member to force the inserted implant forwardly within the sheath to a region where it also bridges the cartilage fault, and then withdrawing the sheath and thrust member from the ear while leaving the implant in its bridging position.

---

**4,147,165**

**SEPARABLE NEEDLE FOR INSERTING A CATHETER INTO THE BLOOD STREAM**

**Stefan O. Tauschinski, Gatterburggasse, 15, Wien, Austria (1190)**

**Filed Apr. 7, 1977, Ser. No. 785,452**

**Claims priority, application Austria, Apr. 15, 1976, 2783/76; Dec. 21, 1976, 9477/76**

**Int. Cl.[2] A61M *5/34***

**U.S. Cl. 128—214.4** **11 Claims**

1. A separable catheter needle assembly for use in inserting a flexible vessel catheter into a blood vessel, comprising:

a pair of semicylindrical needle tube portions made of metal,

and bonded together along their longitudinal edges in face-to-face relationship to form a needle tube;

one of said semicylindrical needle tube portions having a sharp point on the front end thereof; and

a tubular sealing element disposed within said needle tube and extending for substantially the full length thereof, said

tubular sealing element engaging the inner wall of said needle tube and sealing the interior thereof against leakage through said bonded longitudinal edges, and including a rear portion that projects outwardly a substantial distance from the rear end of said needle tube, to provide means for gripping said element for removing it from said needle tube.

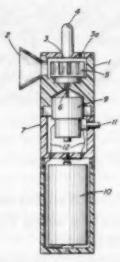
---

**4,147,166**

## ORAL INHALATOR POWDER DISPENSER

**Lloyd F. Hansen, Campbell Hall, N.Y., assignor to American Cyanamid Company, Stamford, Conn.**

**Filed May 2, 1977, Ser. No. 792,748**
**Int. Cl.[2] A61M *15/00***
**U.S. Cl. 128—266** **7 Claims**



1. An oral inhalator powder dispenser comprising:

(A) a cylindrical housing containing an upper and a lower portion; a baffle within said housing separating the upper and the lower portion; a converging funnel-shaped mouthpiece extending laterally from said upper portion; and communicating therewith; aperture means for supporting an open-ended powder medicament capsule on the top of said housing; an opening adjacent said aperture means on the top of said housing; an impeller disposed in said upper portion; and a shaft connected to said impeller at one end and protruding through said baffle; and

(B) rotary means contained in the lower portion of said housing and connected to said shaft at the other end thereof.

---

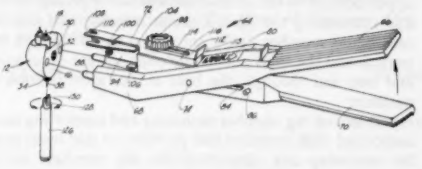
**4,147,167**

## OPHTHALMIC PROSTHESIS IMPLANT INSTRUMENT

**Horst R. Hickmann, 1455 Montegor, Cincinnati, Ohio 45230, and Roosevelt A. Albert, Auburn, Ala., assignors to Horst R. Hickmann, Cincinnati, Ohio**

**Division of Ser. No. 711,884, Aug. 6, 1976, Pat. No. 4,087,867. This application Mar. 10, 1978, Ser. No. 885,373**
**Int. Cl.[2] A61B *17/00*; A61F *9/00***
**U.S. Cl. 128—303 R** **3 Claims**

1. An instrument for applying an opthalmic prosthesis implant to replace the orbital cavity formally occupied by the natural eye, said implant being of the type having a generally hemispherical cartridge member having a flat side and pins protruding from said cartridge member for affixing and permanently attaching said member to the bony orbit, said flat side being provided with at least one bore therein, which comprises an upper handle terminating in a lower jaw and a lower handle provided with a removable upper jaw, said handles being pivoted together behind the jaws thereof and being shiftable between an open position, wherein said jaws are spaced, and a closed position, wherein said jaws approach each other for the engagement of a cartridge member therebetween, and means to bias said handles to said open position, said lower jaw having at least one protruberance extending therefrom to mate with an associated bore in the flat side of said cartridge, said



removable upper jaw comprising bifurcated members which mate with the protruding pins of said cartridge member, whereby said protruberances of said lower jaws are received within the mating bores of said cartridge member and said bifurcated members of said upper jaws are associated with protruding pins of the cartridge member when said jaws in the open position, and when said jaws are shiftable to said closed position, said pins are retracted below the spherical surface of said cartridge member preparatory to placing said implant in the orbital cavity, and then released when said implant is positioned as desired in the orbital cavity so that said implant is affixed and permanently attached to the bony orbit by means of said pins.

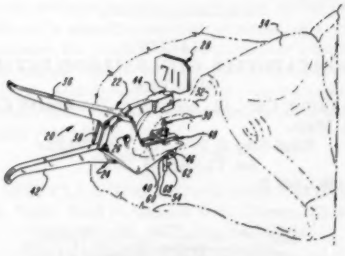
---

**4,147,168**

## ANIMAL IDENTIFICATION TAG APPLICATION TOOL

**Norman J. Hayes, Cody, Wyo., and Andrew C. Bulloch, Dallas, Tex., assignors to Zoecon Corporation, Palo Alto, Calif., a part interest**

**Filed Jul. 5, 1977, Ser. No. 812,490**
**Int. Cl.[2] A61B *17/00*; G09F *3/00***
**U.S. Cl. 128—330** **17 Claims**



1. An animal identification tag applicator tool for applying a two piece animal identification tag assembly to the ear of an animal and which tag assembly comprises an identification tag member made of one piece of relatively soft flexible plastic material including: a base portion having a relatively thin flexible flange portion and a relatively thin reinforcement rib portion with a connecting hole extending through the base portion and the reinforcement rib portion, and an identification portion extending transversely outwardly from said base portion adjacent one peripheral edge thereof and being connected thereto by a flange portion aligned with and forming a continuation of said reinforcement rib portion; and which tag assembly

further comprises a connecting tag member made of one piece of relatively hard plastic material including: a relatively thin base portion with a shaft portion extending transversely outwardly therefrom and an enlarged piercing head portion on the outer end of said shaft portion defining an abuttment surface larger than said shaft portion and said connecting hole; and said applicator tool comprising:

first and second pivotally connected lever means being relatively movable between an open tag loading position and a closed tag assembling position for locating the identification tag member in juxtaposition to the outer surface of the upper portion of the animal ear and the connecting tag member in juxtaposition to the inner surface of the upper portion of the animal ear and for applying force to and connecting the identification member and the connecting tag member on the animal ear by driving the head portion and the shaft portion through the ear of an animal and into and through the hole in the identification tag member;

first and second tag member mounting and supporting means associated with common end portions of said lever means for mounting and supporting the tag members on said lever means;

identification tag member holding slot means associated with said first tag member mounting and supporting means for slidably frictionally releasably receiving the base portion of the identification member in the loading position and for holding the identification member during movement from the loading position to the assembling position during application of assembling forces and for releasing the identification member and enabling sliding movement and withdrawal of the identification member by application of force transverse to the direction of application of the assembling forces after assembly of the identification member and the connecting member;

said identification tag member holding slot means having a slot portion aligned with the hole in the reinforcement rib portion and the head portion during assembly, said slot portion having a size such as to receive the head portion after the head portion passes through the hole in the reinforcement rib portion in the assembling position; and

resilient cushion and support means mounted in said slot portion for abutting the surface portions of said reinforcement rib portion circumjacent the hole therein during passage of the head portion through the hole, said resilient cushion and support means having a hole therein aligned with the hole in the reinforcement rib portion to receive the head portion.

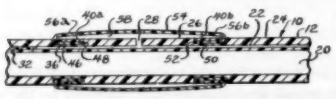
---

**4,147,169**

## BALLOON CATHETER WITH BALLOON RETAINING SLEEVES

**Glenn N. Taylor, Cary, Ill., assignor to The Kendall Company, Boston, Mass.**

**Filed May 2, 1977, Ser. No. 792,823**
**Int. Cl.[2] A61M *25/00***
**U.S. Cl. 128—349 B** **1 Claim**




1. A catheter, comprising:

an elongated shaft having a pair of first and second spaced annular grooves in an outer surface of the shaft;

an inflatable balloon comprising an elongated sleeve of flexible material having first and second end edges adjacent opposed first and second end portions of the balloon; and

a pair of first and second relatively rigid annular retaining sleeves, said first end portion of the balloon being snugly received intermediate the first retaining sleeve and the first groove with said first end edge of the balloon being directed toward said second groove, and said second end portion of the balloon being snugly received intermediate the second retaining sleeve and the second groove with said second end edge being directed toward the first groove, with intermediate side portions of the retained balloon overlying outer surfaces of the retaining sleeves prior to inflation of the balloon said retaining sleeves each being of one-piece construction circumferentially and across the width of the sleeves, and said sleeves being shrunk into the retaining configuration in a relatively rigid and inelastic condition with an internal diameter less than the outer diameter of the shaft.

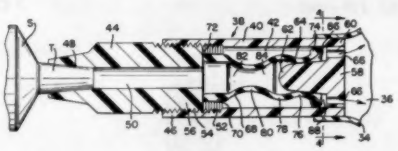
---

**4,147,170**

## CATHETER WITH INFLATION CONTROL DEVICE

**Glenn N. Taylor, Cary, Ill., assignor to The Kendall Company, Boston, Mass.**

**Filed Oct. 28, 1977, Ser. No. 846,292**
**Int. Cl.[2] A61M *25/00***
**U.S. Cl. 128—349 BV** **17 Claims**




1. A catheter, comprising:

an elongated shaft;

an inflatable balloon secured to the shaft;

an inflation lumen extending along the shaft and communicating with the balloon; and

an inflation control assembly comprising,

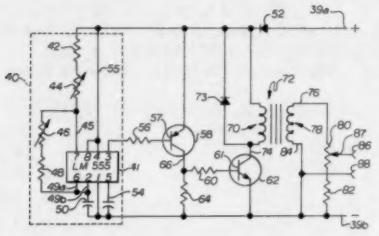
a housing having an inflation port, a chamber, a control member projecting into said chamber and having a circumferential sealing surface, and opening means communicating between the chamber and inflation lumen, and

a generally tubular valve element of flexible material having spaced first and second portions sealingly engaged against the housing and defining a channel intermediate said first and second portions in the chamber, said control member being received in the valve element channel, said valve element having a sealing portion circumferentially biased against and sealingly engaging against said sealing surface of the control member, said sealing portion separating a first section of the channel communicating with said inflation port from a second section of the channel communicating with the opening means, said valve element normally preventing passage of fluid between the inflation port and opening means while said sealing portion is sealingly engaged against said sealing surface, said sealing portion flexing away from the sealing surface responsive to pressure in the first channel section to permit passage of fluid from the inflation port to the opening means and inflate the balloon, and said sealing portion flexing away from the sealing surface responsive to a predetermined pressure in the opening means to permit passage of fluid from the opening means to the inflation port and relieve pressure in the inflated balloon.

## 4,147,171
## TRANSCUTANEOUS PAIN CONTROL AND/OR MUSCLE STIMULATING APPARATUS

Ronald W. Greene, 3116 S. 133rd St., Seattle, Wash. 98168, and John L. Marshall, 16206-123rd Ave. SE., Renton, Wash. 98055

Filed Jan. 28, 1977, Ser. No. 763,542
Int. Cl.[2] A61N *1/36*
U.S. Cl. 128—421 8 Claims




1. An apparatus for treating pain and for stimulation of muscles in the human body by electrical impulses, comprising:

means for generating control pulses of selected rate and duration, wherein said generating means includes (1) timing means, having a trigger input connection, providing in operation an output signal with first and second stable states, the output signal changing from said first stable state to said second stable state when the voltage at said trigger input rises to a first fraction of the supply voltage and further changing from said second stable state to said first stable state when the voltage at the trigger input decreases to a second fraction of the supply voltage, (2) a charging circuit which is initially connected between the supply voltage and said trigger input when the voltage at said trigger input decreases to said second fraction of the supply voltage, and which remains so connected as long as the voltage at the trigger input is increasing but below said first fraction of the supply voltage, (3) a discharging circuit which is initially connected between said trigger input and ground when said voltage at said trigger input reaches said first fraction of the supply voltage, and which remains so connected as long as said voltage at said trigger input is decreasing but above said second fraction of the supply voltage; and

transformer means having primary and secondary windings for producing, under the control of said control pulses, by transformer action, electrical impulses at the secondary of said transformer means of desired rate, duration, and amplitude for application to the human body, wherein the operating characteristics of the transformer are such that the transformer operates near, but not in, saturation over the range of effective current output of the apparatus.

## 4,147,172
## SMOKING MIXTURES

Alan Calder, and Alan J. Herd, both of Blackley, England, assignors to Imperial Chemical Industries Limited, London, England

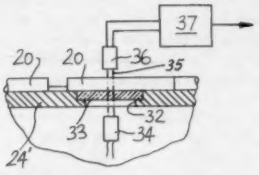
Continuation of Ser. No. 594,086, Jul. 8, 1975, abandoned. This application Jun. 14, 1977, Ser. No. 806,377
Claims priority, application United Kingdom, Jul. 16, 1974, 31426/74
Int. Cl.[2] A24D *1/18*
U.S. Cl. 131—2 12 Claims

1. A process for the manufacture of a smoking material from ingredients comprising a combustible film forming binder, inorganic filler and a smectite which process comprises dispersing the smectite separately in water by agitation to produce a slurry having a viscosity not less than that of a slurry made from the same smectite and water by agitation at 15° C. with an energy input of 0.04 joules/g/sec until a maximum viscosity is reached, thereafter mixing the slurry with the remaining ingredients and fabricating the resultant slurry mixture into a form from which a tobacco-simulating material is obtainable.

## 4,147,173
## APPARATUS FOR MONITORING ROD-SHAPED COMMODITIES IN CIGARETTE MAKING MACHINES OR THE LIKE

Joachim Reuland, Hamburg, Fed. Rep. of Germany, assignor to Hauni Werke Koerber & Co. KG., Hamburg, Fed. Rep. of Germany

Division of Ser. No. 623,660, Oct. 20, 1975, Pat. No. 4,025,770. This application Feb. 1, 1977, Ser. No. 764,681
Claims priority, application Fed. Rep. of Germany, Oct. 20, 1974 P 247 1760
Int. Cl.[2] A24C *5/28*
U.S. Cl. 131—21 B 10 Claims

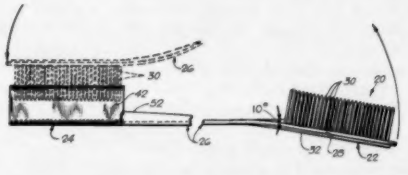



1. In a machine for the making of cigarettes or the like wherein successive increments of a rod having a tubular wrapper and fibrous material confined in said wrapper are conveyed lengthwise along an elongated path, the improvement which consists in the provision of a stationary guide consisting of light transmitting material and defining a first portion of said path, said guide having first and second sides located opposite each other and respectively disposed in physical contact with and at a greater distance from the increments in said first portion; means for severing said rod in a second portion of said path upstream of said first portion so that said rod yields a file of discrete sections which move lengthwise toward and through said first portion and each of which corresponds to one of said increments whereby successive sections of said file slide along and are in physical contact with said first side of said guide to sweep away any dust or other foreign matter tending to accumulate on said first side; and photoelectric monitoring means including a first component constituting a light source arranged to direct a light beam against one side of said guide and a second component constituting a photosensitive transducer, the position of said transducer with respect to said guide and said light source being such that said light beam impinges upon said transducer only after having passed at least once through said light transmitting material from said one side to the other side of said guide.

## 4,147,174
## SELF-CLEANING RETRACTABLE COMB

Lester R. Peilet, 6144 N. Talman Ave., Chicago, Ill. 60659

Filed Jun. 22, 1977, Ser. No. 809,061
Int. Cl.[2] A45D *24/42*
U.S. Cl. 132—119 12 Claims




1. A self-cleaning retractable comb, comprising an elongated

member made in one piece of a flexible resilient resinous plastic material,

said member having first and second longitudinal end portions formed at opposite ends of said member and taking the form of a comb portion and a body portion, respectively,

said member having a flexible elongated handle portion extending longitudinally between said comb portion and said body portion,

said comb portion having a plurality of transversely projecting comb teeth formed integrally thereon and arranged in a longitudinal row,

said body portion having a longitudinal wall formed with a plurality of transverse openings therein for receiving said teeth,

said openings being arranged in a longitudinal row,

said teeth being slidably received in said openings for transverse extending and retracting movement between an extended position with said teeth projecting through said openings and a retracted position with the tips of said teeth retracted into said openings,

said body portion having sidewall means extending transversely from said longitudinal wall for enclosing said teeth when said teeth are in said retracted position,

said handle portion being flexed transversely into a generally U-shaped longitudinal loop when said teeth are in said retracted position,

said comb portion and said body portion having inner longitudinal ends connected integrally to opposite longitudinal ends of said U-shaped loop,

said flexible handle portion serving as a spring affording a resilient biasing action to urge said comb portion and said teeth toward said retracted position,

said member having stop means for limiting the retracting movement of said comb portion due to said resilient biasing action,

said longitudinal wall of said body portion being effective to clean said teeth when said teeth are retracted into said openings.

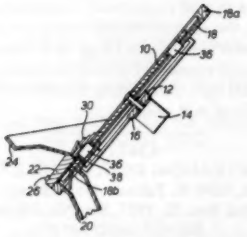
---

**4,147,175**

## COIN HANDLING APPARATUS

**Roy E. G. Webb, 33 Lampits, Hoddesdon, Hertfordshire, England**

**Filed Oct. 12, 1977, Ser. No. 841,567**
**Int. Cl.[2] G07D *3/00***
**U.S. Cl. 133—3 D** **6 Claims**



1. Coin handling apparatus, comprising

a rotary conveyor member defining a plurality of coin-receiving recesses spaced apart around the rotary axis thereof,

means supporting the conveyor and defining its rotary axis to be fixed and inclined to both the horizontal and vertical so that when the conveyor member is rotated about the axis the recesses follow a circular path passing through a lower station and an upper station,

means mounted on the support means for feeding coins to the recesses at the lower station,

means mounted on the support means for sensing the coin in each recess as it passes through the upper station to provide an output indicative of the size of the coin, and

a separator mounted on the support means at the lower station to define with the conveyor means a tunnel through which the recesses of the conveyor member pass on rotation of the conveyor member, the tunnel inhibiting the penetration of coins into the recesses from the coin feeding means while the recesses are in said tunnel.

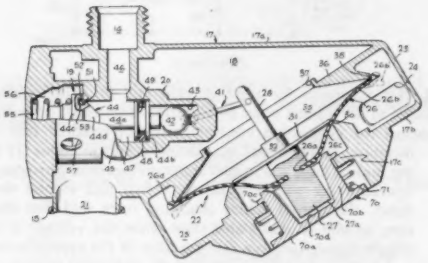
---

**4,147,176**

## DIAPHRAGM ASSEMBLY FOR THE DEMAND REGULATOR OF A BREATHING APPARATUS

**Raymond A. Christianson, 120 8th St., Manhattan Beach, Calif. 90266**

**Filed Jun. 30, 1975, Ser. No. 591,710**
**Int. Cl.[2] A62B *7/04***
**U.S. Cl. 137—102** **10 Claims**



1. A diaphragm assembly for use with a demand regulator having a housing and a flow control valve situated in a valve housing within said regulator housing, said assembly comprising:

a diaphragm situated within said regulator housing to sense inhalation demand, said diaphragm being operatively linked to said flow control valve,

a stationary symmetric conical platform mounted within said regulator housing, said platform having a central opening, said diaphragm being positioned so that its link extends through said central opening and so that upon displacement in response to reduced pressure in said regulator housing said diaphragm will gradually substantially geometrically uniformly seat against said stationary conical platform, thereby reducing the effective sensing area of the diaphragm in uniform proportion to the diaphragm displacement, said displacement in response to reduced pressure opening said flow control valve, and

an aspirator in said valve housing, said aspirator being set to maximize the aspiration effect at low mass flow rates.

---

**4,147,177**

## FLOW REGULATOR

**Frank Iwatsuki, Evanston, Ill., assignor to Gould Inc., Rolling Meadows, Ill.**

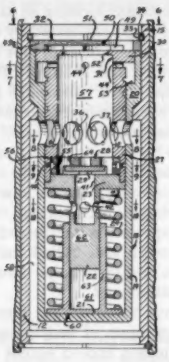
**Continuation of Ser. No. 624,556, Oct. 21, 1975, Pat. No. 4,051,864. This application Jun. 24, 1977, Ser. No. 809,605**
**Int. Cl.[2] G05D *7/01***
**U.S. Cl. 137—504** **11 Claims**

1. In a flow regulator having a cylinder defining an inlet and an outlet, and means for regulating fluid flow through the cylinder from said inlet to said outlet including a biased piston having an end portion defining a radial, planar end surface adjacent said inlet movably received in the cylinder and variable flow passage means controlled by said piston for controlling flow of said fluid to said outlet, the improvement comprising:

means defining a central sensing orifice in said piston end surface for causing positioning of the piston in the cylinder as a function of a fluid pressure drop across said sens-

ing orifice, said end surface defining an annular outer portion about said sensing orifice; and

a stabilizer element extending across said inlet in spaced relationship to said piston end portion and provided with a plurality of distributed openings laterally outwardly offset from said sensing orifice and aligned with said annu-



lar outer portion to define with said annular outer portion flow diverting means causing turbulent radially and angularly inward flow of the fluid over said annular outer portion to the sensing orifice thereby permitting said sensing orifice to function as a knife edge fluid flow control means.

---

**4,147,178**

## LOAD RESPONSIVE VALVE ASSEMBLIES

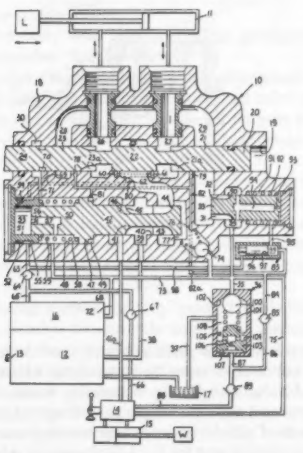
**Tadeusz Budzich, 80 Murwood Dr., Moreland Hills, Ohio 44022**

**Continuation of Ser. No. 716,360, Aug. 20, 1976, Pat. No. 4,107,923. This application Apr. 17, 1978, Ser. No. 894,111**

**The portion of the term of this patent subsequent to Aug. 22, 1995, has been disclaimed.**

**Int. Cl.[2] F15B *13/04, 13/08***

**U.S. Cl. 137—596.1** **9 Claims**



4. A load responsive valve assembly comprising a housing having fluid inlet means connected to a pump, a fluid supply chamber, first and second load chambers, and fluid exhaust means, first valve means to selectively communicate said load chambers with said fluid supply chamber and said fluid exhaust means, positive pressure conducting means communicable with said supply chamber, negative load pressure sensing means selectively communicable with said load chambers by said first valve means, second valve means having fluid throttling means responsive to pressure in said negative load pressure sensing means and operable to throttle fluid flow between at least one of said fluid load chambers and said exhaust means, and deactivating means of said second valve means responsive to pressure differential between said positive pressure conducting means and said negative load pressure sensing means and operable to deactivate said second valve means when pressure in said positive pressure conducting means is higher than pressure in said negative load pressure sensing means.

---

**4,147,179**

## PRESSURE GOVERNOR VALVE EQUIPPED WITH FLOW CONTROL VALVE

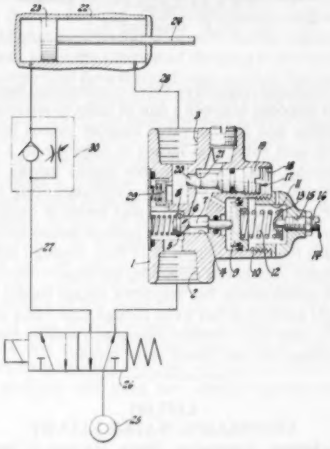
**Tomohiro Miura, Soka, Japan, assignor to Shoketsu Kinzoku Kogyo Co., Ltd., Tokyo, Japan**

**Filed Feb. 23, 1977, Ser. No. 771,116**

**Claims priority, application Japan, Feb. 24, 1976, 51-20076[U]**

**Int. Cl.[2] F15B *13/04***

**U.S. Cl. 137—599** **1 Claim**



1. A pressure governor valve equipped with a flow control valve which comprises:

a casing having a primary side provided with an inlet and a secondary side provided with an outlet;

a first passage disposed inside said casing and communicating said inlet with said outlet, and having an intermediate portion;

a pressure governor valve, including a valve body, closing said first passage on the side of said inlet;

a rod attached to the valve body of said pressure governor valve and brought into contact with a piston imparted with a load by a pressure governing spring;

said pressure governing spring acting on the valve body of said pressure governor valve and opening said valve with an adjustable pressure to reduce the pressure in said first passage to a predetermined pressure between the pressure governor valve and said outlet during both dynamic flow and static operative conditions;

a flow control valve interposed at the intermediate portion of said passage between said outlet and said pressure governor valve;

a second passage disposed inside said casing in parallel with said first passage and communicating said inlet with said outlet; and,

a check valve means mounted in said second passage to block flow from said inlet to said outlet, forcing all fluid flow from said inlet to said outlet through said first pas-

sage and allowing return free flow from said outlet to said inlet when inlet pressure is exhausted.

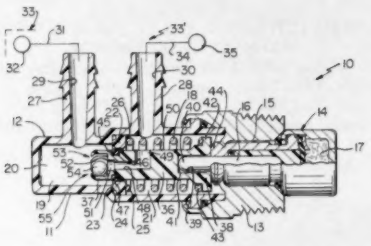
---

**4,147,180**

## CONDITION RESPONSIVE VALVE CONSTRUCTION

**Everett T. Steele, Jr., Knoxville, Tenn., assignor to Robertshaw Controls Company, Richmond, Va.**

**Filed Jun. 22, 1977, Ser. No. 808,875**
**Int. Cl.[2] F16K *15/18***
**U.S. Cl. 137—599.2** **9 Claims**



**1**. In a condition responsive valve construction having valve seat means disposed between a pair of ports to interconnect the same together and having valve member means for opening and closing said valve seat means in response to a condition sensed thereby, said valve member means having a by-pass passage means therein for fluidly interconnecting said ports together even though said valve seat means is closed by said valve member means, said by-pass passage means having check valve means therein to permit fluid flow through said by-pass passage means in only one direction, the improvement wherein said valve construction has restrictor means fluidly interconnecting said ports together even though said valve seat means is closed by said valve member means and said by-pass passage means is closed by said check valve means.

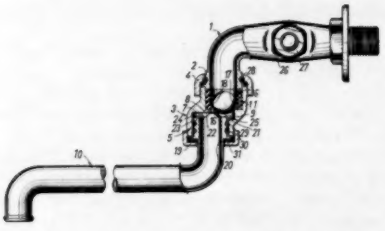
---

**4,147,181**

## SWIVELLING WATER FAUCET

**Hisao Hashimoto, Naganoken, Japan, assignor to Iwatani Sangyo Kabushiki Kaisha, Osaka, Japan**

**Filed Oct. 25, 1977, Ser. No. 845,022**
**Int. Cl.[2] F16K *31/524***
**U.S. Cl. 137—616.5** **11 Claims**



**11**. A swivelling fluid faucet comprising:

(a) a base portion means for receiving the fluid supplied;

(b) a swivelling faucet pipe for delivering said fluid;

(c) joint means for connecting said swivelling faucet pipe to said base portion means;

(d) a first bore recessed at one end of said joint means;

(e) said first bore being in open fluid communication with said base portion means;

(f) a second bore recessed at the second end of said joint means;

(g) a wall in said joint means separating said first and second bores;

(h) a cylindrical aperture piercing said wall joining said first and second bores;

(i) said cylindrical aperture being eccentric with respect to said second bore;

(j) at least one cam means forming an axial extension on the end of said faucet pipe connected by said joint means;

(k) valve ball means in said first bore for sealingly fitting said cylindrical aperture and shutting off the flow of fluid therethrough, said valve ball means protruding through said cylindrical aperture part way into said second bore when in its sealing condition;

(l) said cam means being operative to engage the portion of said valve ball means protruding into said second bore and to move said valve ball means toward said first bore whereby the sealing fit between said valve ball means and said cylindrical aperture is interrupted and fluid is permitted to flow through said cylindrical aperture and said faucet pipe when said faucet pipe is swivelled to at least a first angular position; and

(m) said cam means being further operative at at least a second angular position of said faucet pipe to disengage said valve ball means and to permit sealing fit between said valve ball means and said cylindrical aperture.

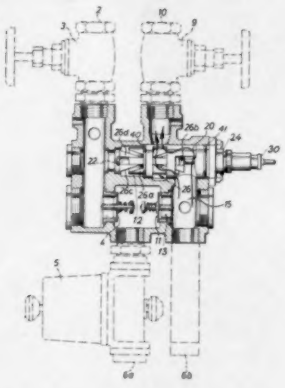
---

**4,147,182**

## CONTROL VALVE, IN PARTICULAR TWO- OR THREE-WAY VALVE FOR HEAT EXCHANGERS AND THE LIKE

**Åke Åkerblom, Farsta, Sweden, assignor to INRECO AB, Stockholm, Sweden**

**Continuation of Ser. No. 518,794, Oct. 29, 1974, abandoned. This application Feb. 23, 1977, Ser. No. 771,375**
**Claims priority, application Fed. Rep. of Germany, Oct. 31, 1973, 7414834**
**Int. Cl.[2] F16K *11/00***
**U.S. Cl. 137—625.17** **9 Claims**



**1**. A control valve, in particular a two- or three-way valve for feeding hot or cold water from an inlet to a heat exchanger, said control valve comprising: a housing in association with said inlet and said heat exchanger; an elongated stem (**22**), at least a portion of which resides in said housing, said stem being mounted for rotation and for axial displacement relative to said housing; a non-rotatable valve part (**26*a***) fixed axially relative to said stem for axial displacement therewith and for axially moving from one to another discrete mode of valving operation; at least one movable valve part (**26*b***) axially movable with said stem, and also axially movable relative to said stem and relative to said non-rotatable valve part; means for positively displacing said stem, said non-rotatable valve part (**26*a***) and said movable valve part (**26*b***) between a first axial position in

which the non-rotatable valve part (26*a*) coacts with a valve seat on the inner surface of the housing for shutting off flow of water through the valve and a second position axially spaced from the first position in which flow of water through the valve is permitted; control means associated with said stem and with said movable valve part, for axially moving said movable valve part relative to said non-rotatable valve part upon rotation of said stem; and port means having a continuously variable port area which is determined by the relative position between said non-rotatable valve part and said movable valve part; said port area serving to control the flow of water between said inlet and said heat exchanger when said non-rotatable valve part is in said second position.

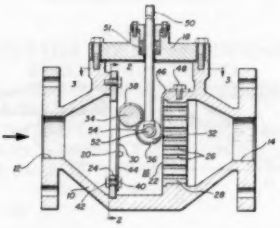
---

**4,147,183**

## VALVE USING ROLAMITE MECHANISM

**Manmohan S. Kalsi, Houston, Tex., assignor to ACF Industries, Incorporated, New York, N.Y.**

**Filed Dec. 19, 1977, Ser. No. 862,087**
**Int. Cl.[2] F16K *13/00***
**U.S. Cl. 137—625.28** **8 Claims**



**1**. A valve comprising:

(a) a valve body with inlet and outlet passageways and a valve chamber therebetween;

(b) said valve chamber having a pair of opposed walls with an inlet port communicating from said inlet passageway through one of said walls and an outlet port through the other one of said walls communicating to said outlet passageway;

(c) a valve member including an elongated flexible tension band and a pair of rollers with said tension band having opposed end portions thereof secured to said valve body, said tension band lying on facing surfaces of both of said opposed walls and looped into a pair of bights which partially encircle said rollers;

(d) said facing surfaces of said opposed walls being spaced apart a distance less than the sum of the diameters of said rollers plus three times the thickness of said tension band;

(e) said tension band having an aperture therethrough in the portion which contacts the wall having said inlet port, said tension band being continuous and imperforate in the portion which contacts the wall having said outlet port; and

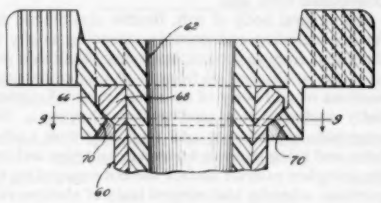
(f) means to displace said rollers operable from the exterior of said valve body such that said tension band continuous portion can be positioned over said outlet port to close the valve, and such that said tension band continuous portion can be positioned to uncover at least a portion of said outlet port to permit at least a limited fluid flow through said valve.

**4,147,184**

## ADJUSTABLE VALVE

**Thurman S. Jess, Mundelein, Ill., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.**

**Continuation of Ser. No. 572,988, Apr. 30, 1975, abandoned, which is a continuation-in-part of Ser. No. 457,936, Apr. 4, 1974, abandoned. This application Aug. 11, 1976, Ser. No. 713,743**
**Int. Cl.[2] F16K *5/02***
**U.S. Cl. 137—625.47** **15 Claims**



**15**. In a valve comprising a body defining a plug-receiving socket defining outwardly extending conduits in communication with the socket; and a plug rotatably positioned in the socket, said plug having channel means therein registrable with the conduits, whereby rotation of the plug in the socket selectively controls fluid flow through said conduit; first and second flanges respectively carried by said body and said plug, said first flange carried by the body extending about the periphery of said socket, said flanges being of differing diameters and positioned in a generally coaxial relationship, whereby one flange occupies a position within the other said flange, the inner of said flanges defining a gripping surface for bearing and sliding relation against the outer of said flanges, the improvement comprising, in combination: the outer of said flanges carrying a pair of spaced, diametrically opposed, inwardly-extending ears, said ears defining gripping surfaces abutting the gripping surface of the inner flange, and positioned whereby the inner of said flanges causes the outward flexing of said spaced ears and portions of the outer flange adjacent said spaced ears, to constantly urge, by interaction of the respective gripping surfaces, said plug and socket together in sealing relation.

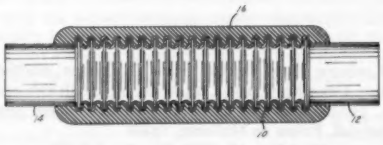
---

**4,147,185**

## FLEXIBLE TUBULAR DEVICE

**Vernon C. Hines, c/o Thermotec Corp., 1001 Tejon St., Denver, Colo. 80204**

**Continuation of Ser. No. 748,777, Dec. 8, 1976, abandoned. This application Mar. 27, 1978, Ser. No. 890,455**
**Int. Cl.[2] F16L *11/14***
**U.S. Cl. 138—121** **7 Claims**



**1**. An improved high pressure flexible, metal tube effective for internal and external high pressure, comprising:

(a) A liquid impervious metal, convoluted, flexible circular tube, constructed and arranged to withstand high pressure fluid therein, and presenting a continuous and unbroken exterior surface.

(b) End connectors integrally attached in liquid tight relation to the ends of said metal convoluted tube, including a straight heavier wall pipe section adjacent to each end of said convoluted tube and extending outwardly with a

generally smooth tubular exterior surface at least about the distance equivalent to the distance of three convolutes.

(c) an integral body of soft, flexible non-porous elastomeric material completely filling the exterior space between the convolutes of the convoluted tube and sealed and bonded to substantially the complete exterior surface of said circular tube, said integral body of soft, flexible elastomeric material extending radially outwardly a substantial distance beyond the outer diameter of the convolutes to provide a relatively thick scuff coating over the metal convoluted tube, and

(d) said integral body of soft, flexible elastomeric material further including end portions extending axially in both directions from said convoluted tube along said pipe sections for a distance of from 2–10 convolutes, said end portions of said body of elastomer material circumferentially enclosing said pipe sections, having a thickness approximately equal to said scuff coat over said convolutes, and being securely bonded to said pipe sections over the complete exterior surface thereof engaged by said end portions, whereby said integral body of elastomeric material permits flexing of the convoluted tube while distributing the produced stresses over the entire area of the convolutes and into said pipe sections.

---

**4,147,186**

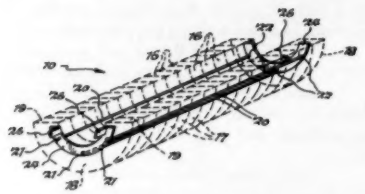
**THERMAL INSULATION ASSEMBLY**

**Louis L. Harting, Crown Point, Ind., and Michael R. Kozlow, Ransomville, N.Y., assignors to The Carborundum Company, Niagara Falls, N.Y.**

**Division of Ser. No. 678,793, Apr. 21, 1976, Pat. No. 4,063,573. This application Oct. 11, 1977, Ser. No. 841,223**

**Int. Cl.[2] F16L *9/22***

**U.S. Cl. 138—155** **8 Claims**



1. A thermal insulation assembly for use in conjunction with a similar assembly to encircle an elongated body, said assembly comprising a series of abutting similar U shaped elements which have similar radial and axial orientation, said series and orientation being retained by a plurality of elongated rods having first and second ends passing through said elements, said rods being joined at their first ends by a first plate and being joined at their second ends by a second plate.

---

**4,147,187**

**SHUTTLE**

**Erik Carlsson; Karel Pejchal; Hans G. Fritzon; Staffan Hagstrom; Anton Kerff, and Lars Wide, all of Ulricehamn, Sweden, assignors to AB IRO, Ulriceham, Sweden and Juan Amengual, Palma de Mallorca, Spain**

**Filed Feb. 15, 1978, Ser. No. 878,000**

**Claims priority, application Fed. Rep. of Germany, Feb. 21, 1977, 2707439**

**Int. Cl.[2] D03D *5/06***

**U.S. Cl. 139—196.2** **5 Claims**

1. In a loom having a thread supply at each side thereof from which weft threads are drawn alternately by a weft thread carrier confined to back and forth motion across the loom, wherein said carrier, in moving away from each side of the loom, takes up a thread segment that is connected with the thread supply at that side of the loom and with a previously laid weft thread and draws said thread segment into a U-shaped loop, and wherein said thread segment is severed from said previously laid weft thread when said carrier is about halfway across the loom so that the end of the loop freed by the severing can be drawn to the other side of the loom, the improvement which is characterized by:

A. a pair of elongated thread gripping hooks fixed on the weft thread carrier,

(1) each of said hooks having a front end portion which is remote from the front end portion of the other,

(2) said hooks being aligned with one another and spaced apart in the direction of carrier motion and having their said front end portions at a common level, and

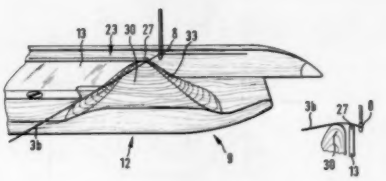
(3) each of said hooks having a lower surface which is inclined downwardly from said level and rearwardly away from its front end portion;

B. a pair of thread eyes, one at each side of the loom, through each of which thread from the thread supply at its side of the loom extends for supporting guidance, each of said thread eyes being,

(1) at a fixed location that is adjacent to the path along which said thread gripping hooks are carried during shuttle motion, to be at one side of said hooks as they pass the thread eye,

(2) below said level, and

(3) so disposed in relation to other means on the loom by



which the thread through the thread eye is supported that a length of said thread extends away from the thread eye obliquely across the path of the thread gripping hooks at a level below said common level of the thread gripping hooks and at an inclination towards the other side of the loom; and

C. said weft thread carrier having thread control means thereon providing a weft thread deflecting surface for each thread gripping hook, said thread control means

(1) being spaced to the opposite side of said thread gripping hooks and

(2) rising from substantially below said level so that there is a substantially deep slot between each of said hooks and the thread control means, and

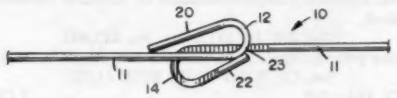
(3) each weft thread deflecting surface having a rearwardly and upwardly inclined front flank which is spaced forwardly of the front end of its thread gripping hook and which rises to above said level, whereby a thread length extending from a thread eye and across the paths of said thread gripping hooks and said thread control means at a rearward inclination to the direction of weft thread carrier motion is deflected upwardly past said hook but a thread length extending from a thread eye and across said paths at a forward inclination to said direction of motion is permitted to be engaged by said hook.

**4,147,188**

## BALE-TIE WIRE

**Emil Simich, Chicago, Ill., assignor to A. J. Gerrard & Company, Des Plaines, Ill.**

**Filed Dec. 19, 1977, Ser. No. 862,104**
**Int. Cl.[2] B21F** *15/04*
**U.S. Cl. 140—101** **2 Claims**




1. An elongated bale-tie wire comprising a body portion and engaging looped end members integral to said body portion, each of said looped end members being oppositely curved substantially in the plane of said body portion and having a portion bent out of the plane in opposite direction thereof, said looped end members each including legs extending rearwardly from said end members and engageable with said body portion to form a closed loop therewith, and wherein one of said legs on one of said looped end members is longer in length than the other of said legs on the other of said looped end members, said looped end members being selectively and sequentially engageable with one another to form a fastened bale-tie joint about the bale.

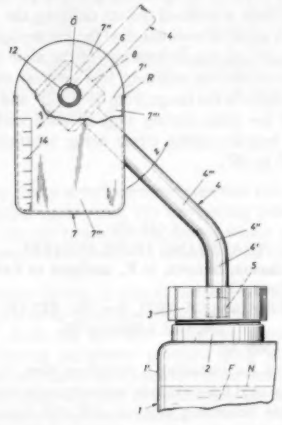
---

**4,147,189**

## APPARATUS FOR THE DOSED DISPENSING OF FREE-FLOWING MEDIA

**Gerhard Wippermann, Dr.-Hammacher-Strasse 3a, 4100 Duisburg 13, Fed. Rep. of Germany**

**Filed Aug. 25, 1977, Ser. No. 827,735**
**Claims priority, application Fed. Rep. of Germany, Sep. 3, 1976, 2639724; Jul. 9, 1977, 2731155**
**Int. Cl.[2] B65B** *3/04*
**U.S. Cl. 141—18** **16 Claims**



1. An apparatus for the dosed dispensing of free-flowing media from supply containers into a dosing cup, comprising

a manually readily liftable and lowerable supply container having a flow-out tube defining a first portion operatively extending in at least a direction having a vertical component and communicating with media in the supply container,

said flow-out tube having a second portion communicating with said first portion and forming a transverse arm extending operatively substantially horizontally and transversely relative to said first portion of said flow-out tube,

a dosing cup formed as a swing being swingingly suspended on said transverse arm of said flow-out tube,

said flow-out tube is formed with a discharge opening in said transverse arm pointing into said cup when said supply container is in a pivotally lifted position relative to said cup via said transverse arm with the level of the media in said supply container being higher than said discharge opening.

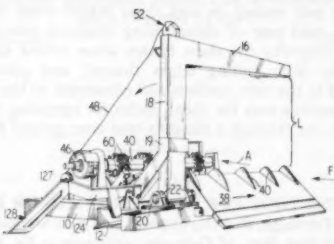
---

**4,147,190**

## DELIMBING APPARATUS

**Georges E. Nadeau, 167 Golden Ave., Apt. 10, Timmins, Ontario, Canada**

**Filed Jun. 21, 1977, Ser. No. 808,630**
**Claims priority, application Canada, Jun. 22, 1976, 255463**
**Int. Cl.[2] A01G** *23/08;* **B27L** *1/00*
**U.S. Cl. 144—2 Z** **8 Claims**




1. Apparatus for delimbing felled trees comprising, a base adapted to be secured in a fixed position, first and second groups of cutter blades, elongated support means attached to said base for supporting said first and second groups of cutter blades therealong generally transversely relative to said base, said supporting means for said blades being arranged such that the blades are capable of simultaneously engaging a plurality of generally parallel tree trunks in such manner as to sever limbs from said trunks when the latter are moved longitudinally relative to the base through said apparatus, and force transmitting means connected to said means for supporting said first and second groups of cutter blades, said force transmitting means being adapted to hold said first and second groups of blades in limb severing engagement with first and second opposing sides, respectively, of said tree trunks as they are moved longitudinally through the delimbing apparatus, whereby the sever limbs from said tree trunks, and means for removing accumulated severed limbs from the delimbing apparatus including a movably mounted ejector means movable between (a) a first position so related to said groups of blades as to enable the ejector means to receive and support thereon limbs which have been severed from the tree trunks by said blades to (b) a second position displaced from the groups of blades wherein the limbs accumulated thereon escape from the ejector means, and a motion transmitting linkage connected to said ejector means for moving the latter from the first position to the second position.

---

**4,147,191**

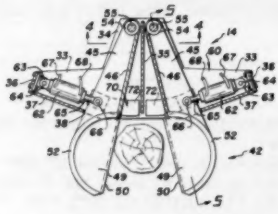
## TREE SHEARING APPARATUS

**Everett I. Giese, P.O. Box 610, Prince George, British Columbia, Canada (V2L 4S8)**

**Filed Aug. 22, 1977, Ser. No. 826,429**
**Int. Cl.[2] A01G** *23/08*
**U.S. Cl. 144—34 E** **6 Claims**

1. Tree shearing apparatus comprising a main frame adapted to be placed in a generally upright position alongside a standing tree, a housing at a lower end of the main frame, said

housing being shaped to provide side portions projecting laterally of the main frame and a rear portion, a pair of shears mounted in the housing, said pair of shears including elongated inner members and opposing shear blades projecting forwardly of the housing, hinge means connecting rearmost ends of the elongated inner members to the rear portion, guide means carried by the side portions for guiding the shear blades and for



transferring to said side portions a major portion of the weight of a cut tree resting on said shear blades when in a closed position, said pair of shears being disposed relative to one another whereby the shear blades when closed are inclined upwardly from cutting edges thereof, and power means mounted in the side portions and connected to the elongated inner members near the shear blades for operating the pair of shears to cut through a standing tree near ground level.

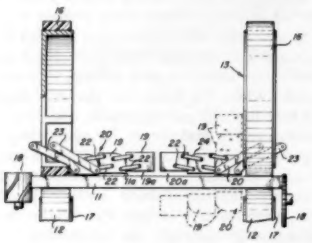
---

**4,147,192**

## MACHINE TOOL FOR WOOD, PLASTICS OR THE LIKE

**Helmut Torwegge, Bad Oeynhausen, and Rolf Steckstor, Lohne, both of Fed. Rep. of Germany, assignors to Fa. Franz Torwegge, Bad Oeynhausen, Fed. Rep. of Germany**

**Filed Mar. 21, 1977, Ser. No. 779,911**
**Int. Cl.[2] B27C *1/14*; B27G *21/00***
**U.S. Cl. 144—251 R** **2 Claims**



1. Apparatus for machining a workpiece formed of wood, synthetic plastic material or the like, comprising

(a) a frame;

(b) transport means for transporting the workpiece across the frame;

(c) at least one working tool connected with said frame laterally of the path of travel of the workpiece; and

(d) at least one sound damping cover means connected with said frame laterally of the path of travel of the workpiece, said sound damping means including

(1) a series of sound damping members pivotally connected at their adjacent ends to define a cover unit; and

(2) means connecting said cover unit at one end with said frame for transverse displacement between retracted and extended positions relative to the workpiece, said cover unit in the extended position extending transversely at its outer end at least partially across the sound radiating region of the workpiece adjacent the tool, said connecting means including parallel lever means for effecting pivotal movement of said cover unit to a retracted position contained in a receiving space defined within said frame, said sound damping members, when in said retracted position, being stacked in adjacent relation one on top of another.

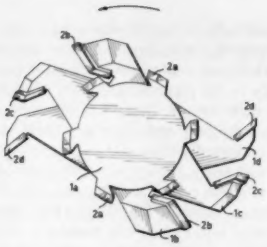
---

**4,147,193**

## CUTTER HEAD

**Eero M. Kivimaa, Linnankoskenkatu 15 A, 00250 Helsinki 25, Finland**

**Filed Jul. 20, 1977, Ser. No. 817,452**
**Claims priority, application Finland, Jul. 30, 1976, 762180**
**Int. Cl.[2] B27G *13/04*; B27L *11/02***
**U.S. Cl. 144—235** **7 Claims**



1. A cutter head especially for canter-chipping of logs or for edging of boards, having an axis of rotation which is substantially perpendicular to the direction of feed of the log, the cutter head being made up of at least two sets of cutting knives, which sets of knives define respective cutting circles, the diameters of the cutting circles increasing stepwise in the direction away from the log along said axis of rotation, the entire cutting width of the cutter head thereby being divided into parallel cutting strips defined by said sets of knives, each cutting knife having a main cutting edge which is straight, and the knives of two adjacent sets, defining smaller and larger cutting circles respectively, said sets of knives being staggered one after the other so that a knife of the set defining the larger cutting circle always cuts before a knife of the set defining the smaller cutting circle, the angle of inclination of the projection, on a plane passing through said axis of rotation, of the main cutting edge of each knife of the set defining the smallest cutting circle being substantially in the range from 55° to 75° and the angle of inclination of the main cutting edge of each knife of the set defining the largest cutting circle being substantially in the range from 0° to 30°.

---

**4,147,194**

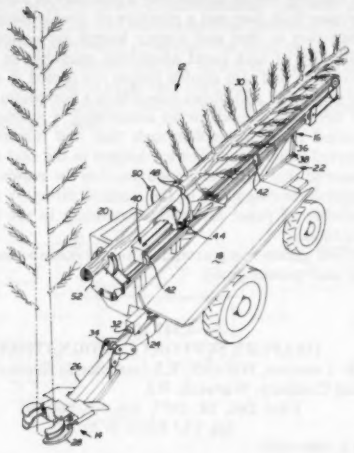
## TRAVELING HOSE SYSTEM

**Thomas E. Johnson, Batavia, N.Y., assignor to Eaton Corporation, Cleveland, Ohio**

**Filed Aug. 25, 1977, Ser. No. 827,527**
**Int. Cl.[2] A01G *23/08***
**U.S. Cl. 144—309 AC** **8 Claims**

1. A method for installing a traveling hose on a tree harvester wherein said hose extends between a stationary member and a movable delimbing head of said tree harvester and is reeved over a take-up reel movable in a path parallel to the path of said movable delimbing head, comprising selecting a hose of a length a predetermined amount shorter than a predetermined reeved distance between said stationary member and said delimbing head, putting said delimbing head in position relative to said stationary member to receive said hose in an unstretched condition; attaching one end of said hose to said delimbing head and the other end to said stationary member with the hose reeved over said take-up reel, extending said delimbing head relative to said stationary member, stopping

movement of said take-up reel at a predetermined point in its travel relative to said stationary member, and continuing the



extension of said delimbing head to stretch said hose between said stationary member and said delimbing head.

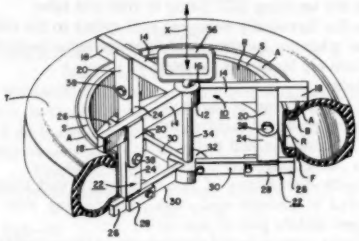
---

**4,147,195**

## TRUCK TIRE SAFETY CLAMP

**Dell V. Halfacre, Manila, Ark. 72442**

**Filed Dec. 12, 1977, Ser. No. 859,891**
**Int. Cl.[2] B60C *25/00***
**U.S. Cl. 157—1** **7 Claims**



1. A safety clamp to be locked to a tire and rim while the tire is being inflated on the rim, the tire having beads which are held on the rim by retaining ring means which are applied to the rim to form a composite rim assembly, the clamp comprising:

a fixed frame having a central hub with a bore extending through it in an axial direction, the frame extending outwardly from the hub above the rim assembly and the frame having peripheral portions lying in a first plane oriented normal to said axial direction and the peripheral portions being disposed to overlie one tire bead when the safety clamp is applied thereto;

multiple locking members each having an arm including a first end extending toward said frame, the arms being annularly spaced from each other and being pivotally connected to the frame respectively adjacent to said peripheral portions, and each arm having a second end supporting a lug which extends normal to the arm and away from the hub of the frame, each lug underlying the rim assembly and the other tire bead and lying in a second plane parallel to said first plane when the safety clamp is locked thereto;

a rod extending through the bore and carrying a cross-head located between said multiple locking members; and

a connecting link connected between the cross-head and each locking member adjacent to the lug, the cross-head and connecting links and lugs all lying substantially in said second plane when the rod is moved to a locked position in which the lugs underlie the rim assembly and the other tire bead, and the rod having an unlocked position in which the cross-head is located adjacent to said hub and the connecting links retract the multiple locking members to pivot the arms and lugs thereof away from the tire and rim assembly.

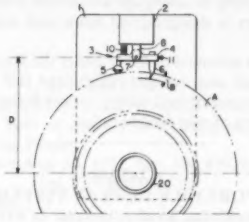
---

**4,147,196**

## APPARATUS FOR CUTTING CIRCUMFERENTIAL GROOVES IN THE TREAD OF A TIRE

**Jean Jarry, Clermont-Ferrand, France, assignor to Compagnie Generale des Etablissements Michelin, Clermont-Ferrand, France**

**Filed Oct. 3, 1977, Ser. No. 840,516**
**Claims priority, application France, Oct. 4, 1976, 76 29995**
**Int. Cl.[2] B29H *21/00***
**U.S. Cl. 157—13** **11 Claims**



1. An apparatus for cutting at least one circumferential groove in the tread of a tire having at least one ply of metal reinforcing cables below its tread, comprising at least one assembly formed of a knife whose cutting edge has the shape of the radial profile of the grooves to be created and a support to which the knife is connected and which guides the knife with respect to the tire to be treated, the support being connected to a frame for bearing the tire, this apparatus being characterized by the fact that the support furthermore comprises a feeler, said feeler being formed of a detector which is sensitive to the distance between it and said ply, the apparatus furthermore comprising a device controlled by the detector and maintaining the end portion of the cutting edge of the knife at a predeterminable constant distance from said ply.

---

**4,147,197**

## FIRE DOOR AND OPERATOR THEREFOR

**Morris W. Bailey, Fort Worth; John J. Luby, Dallas, both of Tex., and Donald G. Carlton, Orangevale, Calif., assignors to Overhead Door Corporation, Dallas, Tex.**

**Filed Jun. 20, 1977, Ser. No. 807,926**
**Int. Cl.[2] B01D *1/22, 1/14***
**U.S. Cl. 160—7** **7 Claims**

1. In a control device for a fire door having a roll with a flexible panel wrappable therearound, wherein said control device includes energy storage means releasable in response to a signal, such as the melting of a fusible link, for initiating unwrapping rotation of said roll, and wherein said roll after such initiating will continue to rotate in response to the gravitational effect on the panel unwrapping therefrom, the improvement comprising:

shaft means coaxially affixed to said roll;

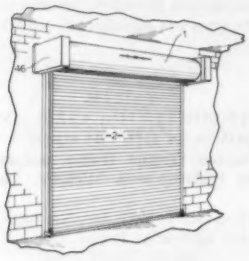
actuating means connected to said shaft means for rotating same in a panel wrapping direction;

frictional means operably connected to said shaft means for

limiting the rate at which said panel is unwrapped from said roll;

clutch means releasably connecting said frictional means to said actuating means, said clutch means having a pair of separable parts and resilient means urging said parts into driving engagement;

disconnect means for disengaging said clutch means in response to said melting of said fusible link, said disconnect



means including cam means operable to separate said parts, whereby to disengage said clutch means so that said shaft means is disconnected from said actuating means; and

torque means mounted to move under the force of gravity to operate said cam means to disengage said clutch means, said movement of said torque means being responsive to said melting of said fusible link.

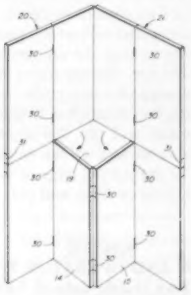
---

**4,147,198**

**PORTABLE DISPLAY SYSTEM**

**Willy Ytter, Stockholm, Sweden, assignor to Extraversion, Inc., Dover, Del.**

**Filed Oct. 3, 1977, Ser. No. 838,667**
**Int. Cl.[2] A47G** *5/00*
**U.S. Cl. 160—135** **9 Claims**



1. A portable display system comprising:

a plurality of panels each having a detachable front wallboard and detachable rear wallboard;

a first and second peripheral support means to support and position said detachable front and rear wallboard in a substantially parallel and confronting relationship so as to form a panel assembly; said first peripheral support means removably positioned along at least one outer edge of said detachable front and rear wallboard, said second peripheral support means positioned along the remaining edges of said detachable front and rear wallboard so that said detachable front and rear wallboard is removable from said first and second peripheral support means in a direction perpendicular to the edge along which said first peripheral support means is positioned,

hinging means for connecting a plurality of said panel assemblies to each other so that said panel assemblies are divided into a first and second group;

said hinging means comprising a plurality of corner hinges greater than two and a plurality of double hinges greater than two so that said corner hinges are connected to a plurality of said panel assemblies movable in a vertical direction and said double hinges connected to a plurality of said panel assemblies movable in a horizontal direction,

said first and second group comprising a number of connected panel assemblies such that said number of connected panel assemblies are hinged in the said two directions so that in the extended position the number of panel assemblies extending in the vertical direction equals the number of panel assemblies extending in the horizontal direction,

said first group being extended to said position independent of said second group.

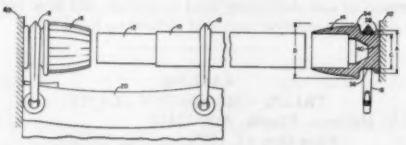
---

**4,147,199**

**DRAPERY SUPPORT COMBINATION**

**John K. Cameron, Warwick, R.I., assignor to Kenney Manufacturing Company, Warwick, R.I.**

**Filed Dec. 14, 1977, Ser. No. 860,591**
**Int. Cl.[2] E06B** *9/20*
**U.S. Cl. 160—330** **3 Claims**



1. A drapery support comprising in combination;

a curtain rod comprising a pair of hollow telescoping tubes;

a helical compression spring within said tubes;

means for securing said spring to one said tube;

means for threadedly engaging said spring to the other said tube whereby twisting said tubes relative to each other effectively lengthens the rod;

a curtain;

a finial at each end of said rod,

having an enlarged middle part;

rings mounted on said rod;

means connecting said curtain to said rings;

the inside dimensions of the opening of said rings being limited to prevent said rings from passing over the enlarged middle part of said finial;

an annular groove in said finial nearer to the end of said finial than said middle part the diameter of said annular groove being smaller than the minimum inside diameter of said rings whereby said annular groove is adapted to receive and retain a ring adjacent to the end of said finial;

a pair of walls in opposed relation defining a curtain receiving opening; and

said rod mounted between said walls under spring compression supporting said curtain by rings on said rod and by one ring in each said annular groove.

---

**4,147,200**

**METHOD AND APPARATUS FOR ELIMINATING ENTRAPPED GAS IN DIE CASTINGS**

**Robert G. Warsinski, Southfield, and George R. Wlodyga, Walled Lake, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.**

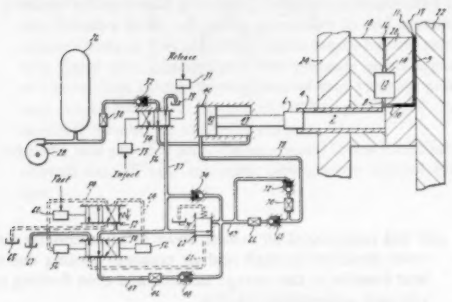
**Filed Jul. 11, 1977, Ser. No. 814,519**
**Int. Cl.[2] B22D** *17/32, 17/10*
**U.S. Cl. 164—4** **10 Claims**

1. A method of controlling the shot speed in a die casting machine which includes an injection tube for delivering a shot of molten casting material to a die cavity, an injection plunger mounted for translation within said tube at controlled shot

speeds, an opening in said tube for receiving a shot of molten casting material internal to said tube in the translational path of said plunger, said die cavity communicating with one end of said tube for receiving said molten material delivered from said tube, wherein said method comprises the steps of:

translating said injection plunger to a first extreme position within said tube to clear said opening;

placing a shot of molten casting material in said opening of said injection tube;



translating said injector plunger from said extreme position towards said die cavity end of said tube at a first predetermined shot speed;

providing a sensing means proximate said die cavity and said one end of said tube for sensing the entry of said molten material to said die cavity and producing a high speed shot signal;

translating said injector plunger at a second predetermined shot speed higher than said first shot speed in response to the production of said high speed shot signal to thereby inject said molten material into said die cavity.

---

**4,147,201**

## METHOD OF MANUFACTURING OF A METALLURGICAL MOLD

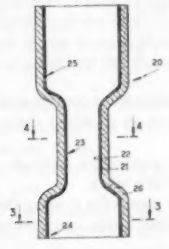
**Maurice Rabinovitch, Chatillon, and Pierre Magnier, Chatenay-Malabry, both of France, assignors to Office National d'Etudes et de Recherches Aerospatiales (O.N.E.R.A.), Chatillon and Microfusion S.A., Gennevilliers, both of, France**

**Filed Feb. 18, 1976, Ser. No. 659,014**

**Claims priority, application France, Feb. 20, 1975, 75 05345**

**Int. Cl.[2] B22C** *9/04, 7/02*

**U.S. Cl. 164—35** **1 Claim**



1. A method of making a mold for the directional solidification of a metall alloy composite to produce parts of complex shape of refractory directionally solidified polyvariant fiber-reinforced composite having eutectic-type structure consisting essentially of two distinct independent phases constituted by:

(a) a complex multicomponent matrix phase consisting essentially of:

i. at least one metal selected from the group consisting of Fe, Ni and Co, and

ii. chromium in an amount between 10 and 25 percent by weight of the composite;

and in said matrix:

(b) an in situ grown reinforcing phase free from chromium and consisting essentially of whisker-like elongated monocrystalline fibers of at least one metal monocarbide, the metal of which is selected from the group constituted by Ta, Nb, Hf and Ti, said method comprising the steps of:

preparing a model of a part to be produced by forming a wax shape of the part to be produced, chemically applying a silver film to said wax shape, and electrolytically depositing a metal forming an external surface of said model on said silver film, said external surface having a melting point sufficiently high to resist deposit by plasma or flame spraying of a refractory metal oxide selected from the group which consists of aluminum oxide, zirconium oxide and magnesium oxide having a purity of at least 99.5%;

depositing by plasma or flame spraying onto said model a one piece thin, dense and nonporous shell of said oxide; and

separating said shell from said model by a physical or chemical treatment whereby said separated shell forms said mold.

---

**4,147,202**

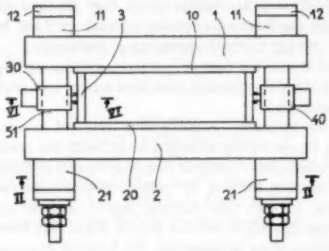
## CONTINUOUS CASTING INGOT MOULD

**Pierre Gay, La Tour en Jarez, France, assignor to Clesid S.A., Saint-Chamond, France**

**Filed Aug. 30, 1977, Ser. No. 829,091**

**Int. Cl.[2] B22D** *11/04*

**U.S. Cl. 164—436** **8 Claims**



1. A continuous casting ingot mould comprising:

a front plate;

a back plate adapted to be spaced from said front plate;

two lateral plates disposed between said front and back plates;

a stationary frame;

a movable frame;

said front and back plates being disposed on a respective one of said stationary and movable frames;

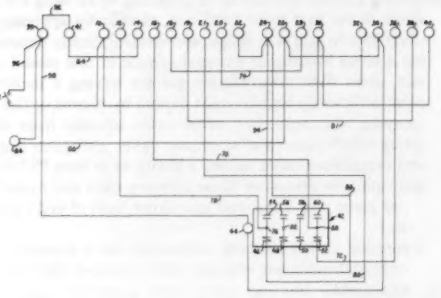
clamping means for said movable frame with respect to said stationary frame for clamping said lateral plates between said front and back plates; and

support means for supporting said movable frame with respect to said stationary frame comprising two columns fixed to said stationary frame and arranged with their axes perpendicular to said stationary frame and two articulations each mounted to slide axially on a respective one of said columns, one of said articulations being fixed to said movable frame and the other of said articulations being mounted to slide relative to said movable frame in a direction parallel to a plane extending through said axes of said columns and transverse to said axes of said columns.

## 4,147,203
## METHOD AND APPARATUS FOR CONTROLLING THE HEATING AND COOLING FUNCTION OF A HEAT PUMP SYSTEM

John F. Rayfield, P.O. Box 597, Hollister, Mo. 65672

Filed Nov. 9, 1977, Ser. No. 849,974
Int. Cl.[2] F25B *29/00*
U.S. Cl. 165—2 13 Claims



1. A low voltage control apparatus for use in a heat pump heating and cooling system operable to regulate the temperature within a controlled environment, said heat pump system comprising an indoor thermostat operable to generate a cooling signal when the temperature within the controlled environment rises above a preset maximum temperature, a first heating signal when the temperature within the controlled environment drops below a first preset minimum temperature, and a second heating signal when the temperature within the controlled environment drops below a second preset minimum temperature that is lower than said first minimum temperature; an outdoor heat pump operable to heat and cool the controlled environment; and an indoor fossil fuel furnace operable to supplement the heating capacity of said outdoor heat pump, said low voltage control apparatus comprising:

terminal means for operably coupling the control panel with said indoor thermostat, said heat pump, and said fossil fuel furnace; and

means for operably coupling said terminal means, said coupling means being arranged to activate the cooling operation of said heat pump in response to said cooling signal, to activate the heating operation of said heat pump in response to said first heating signal, and to activate the heating operation of said indoor fossil fuel furnace while simultaneously terminating the heating operation of said outdoor heat pump in response to said second heating signal.

---

## 4,147,204
## COMPRESSED-AIR STORAGE INSTALLATION

Hans Pfenninger, Baden, Switzerland, assignor to BBC Brown, Boveri & Company Limited, Baden, Switzerland

Filed Nov. 17, 1977, Ser. No. 852,488
Claims priority, application Switzerland, Dec. 23, 1976, 16244/76
Int. Cl.[2] F23L *15/02;* B65G *5/00*
U.S. Cl. 165—4 10 Claims

1. A compressed-air storage installation comprising:

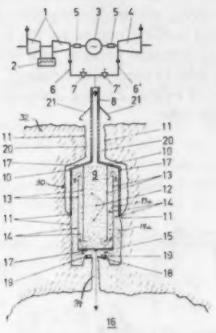
a heat accumulator for storing heat contained in compressed air moving through said heat accumulator;

at least one subterranean cavern into which there is passed the air moving through the heat accumulator;

a storage medium disposed within said heat accumulator for the storage of the heat of the compressed air moving through the heat accumulator;

partition means arranged in the storage medium for forming a number of air passages through which hot compressed air flows in an essentially outward direction;

means for infeeding the hot compressed air to the heat accumulator;



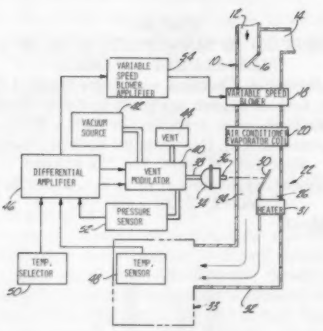
said hot compressed air which flows in an essentially outward direction through said air passages cooling due to heat transfer to the storage medium and then flowing on into said subterranean cavern.

---

## 4,147,205
## VACUUM ACTUATED AUTOMATIC TEMPERATURE CONTROL SYSTEM WITH ACTUATOR PRESSURE SIGNAL FEEDBACK

George T. Bata, Grafgon, and Van P. Spiker, Newport News, both of Va., assignors to The Bendix Corporation, Southfield, Mich.

Filed Sep. 12, 1977, Ser. No. 832,142
Int. Cl.[2] F25B *29/00;* B60H *3/00*
U.S. Cl. 165—26 10 Claims




1. An automatic temperature control system for producing a selected temperature in an enclosed space, said system comprising:

selector means for generating a signal corresponding to a selected temperature level;

temperature sensor means for sensing the temperature level within said enclosed space and generating a corresponding signal;

means for generating an error signal corresponding to the difference between said selector means signals and said temperature sensor signals;

means for increasing or decreasing the temperature level in said enclosed space in response to generation of said error signal;

said last named means including an actuator device having a movable output member which causes an increase or decrease in the temperature level of said enclosed space upon assuming a corresponding position;

said last named means further includes means causing said movable member to assume a corresponding position in response to generation of said error signal, including pressure transducer means, said pressure transducer means generating a variable fluid pressure in correspondence with said error signal;

said actuator means being responsive to the level of pressure generated by said pressure transducer means to assume said corresponding position of said movable member;

pressure sensor means generating a signal corresponding to said pressure level and means responsive to said pressure sensor means to null said error signal means by said pressure signal upon generation of said pressure sensor signal corresponding to the development of said variable pressure corresponding to the corresponding position of said movable member to said error signal;

whereby said pressure sensor means signal forms a feedback control loop in said automatic temperature control system.

---

**4,147,206**

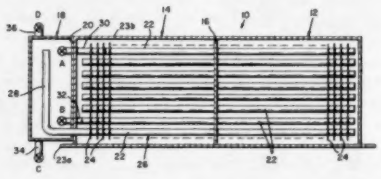
## SEMI-ACTIVE TEMPERATURE CONTROL FOR HEAT PIPE HEAT RECOVERY UNITS

**Algerd Basiulis, Redondo Beach, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.**

**Filed Jun. 17, 1977, Ser. No. 807,466**

**Int. Cl.[2] F28D** *15/00*

**U.S. Cl. 165—32** **4 Claims**



1. A heat exchanger unit with temperature control comprising:

intake and exhaust ducts for transferring at least two flows of fluids in which a first of the fluids is subject to excessive cooling in a first of said ducts sufficient to effect deleterious cooling of a second of the fluids in a second of said ducts;

heat pipes with working fluid therein extending between said ducts for exchanging heat therebetween and between said first and second fluids;

working fluid trap portions coupled to at least a number of said heat pipes; and

means coupled to said working fluid trap portions comprising an enclosure surrounding said working fluid trap portions with at least two couplings respectively between said enclosure and said intake and exhaust ducts, valves in said couplings, at least one outlet from said enclosure, and means coupled at least to said valves for maintaining a first of said valves open and a second of said valves closed, and vice-versa, whereby said number of said heat pipes are fully saturated with said working fluid in the absence of the excessive cooling and said working fluid is withdrawn from said number of said heat pipes and held in said working fluid trap portions during the excessive cooling.

**4,147,207**

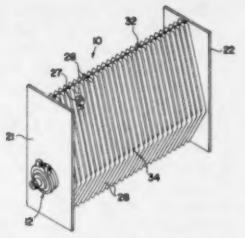
## CONVECTIVE-TYPE RADIATOR WITH INTERNAL HEAT TRANSFER MEDIUM

**Leo Lesyk, Walton Hills, Ohio, assignor to Bird Electronic Corporation, Solon, Ohio**

**Filed Aug. 18, 1977, Ser. No. 825,645**

**Int. Cl.[2] F28D** *15/00*

**U.S. Cl. 165—106** **4 Claims**



1. A radiator for cooling a liquid medium contained therein that circulates by convection around an internal heat source to absorb heat energy from said heat source, comprising:

a housing containing said liquid medium and having opposed end walls and at least four laterally finned quadrilateral side walls secured to said end walls, said side walls defining a prism of aerodynamic form with its axis horizontal, said side walls intersecting in perpendicular diagonal planes, including a horizontal plane and a vertical plane, through said prism

said horizontal plane intersecting said vertical plane at a location more closely spaced to the lower end of said prism than to the upper end to provide an optimal aerodynamic prismatic form whereby said housing has a low resistance to the upward convective flow of atmosphere as said housing transfers heat energy to said upwardly flowing atmosphere and to provide a location for said internal heat source.

---

**4,147,208**

## HEAT EXCHANGER

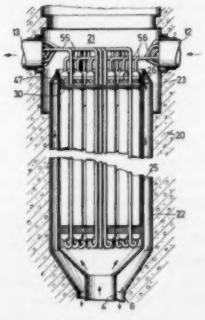
**Roland Naegelin, Winterthur, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland**

**Filed Oct. 5, 1976, Ser. No. 729,821**

**Claims priority, application Switzerland, Oct. 6, 1975, 12926/75**

**Int. Cl.[2] F28F** *9/00*

**U.S. Cl. 165—159** **7 Claims**



1. A heat exchanger comprising

a plurality of sub-assemblies, each sub-assembly including a plurality of straight tubes; a pair of tube sheets mounting

said tubes therein, each tube sheet being disposed at a respective end of said straight tubes; a pair of spherical shells, each said shell extending over a respective tube sheet; an inlet line connected to one of said shells to deliver a flowable medium into said shell for passage through said straight tubes; an outlet line connected to the other of said shells to exhaust the medium from said straight tubes; a guide tube surrounding said straight tubes and having openings at opposite ends for conducting a flowable medium therethrough over said straight tubes; and an outer flange on said guide tube intermediate said opposite ends, said flanges of said sub-assemblies being disposed adjacent to each other to form a seal preventing a flow of the flowable medium from passing about each said guide tube between said ends thereof;

a common plate having said flange of each sub-assembly supported thereon to suspend each subassembly on a vertical axis, said plate having a plurality of openings for each sub-assembly of a size corresponding to the dimensions of a respective guide tube;

a common tubular wall about said sub-assemblies and secured to said common plate, said tubular wall having openings on one side of said common plate communicating with said openings of said guide tube of each subassembly on said side; and

a shell secured in seal-tight manner to said tubular wall at said side to form an annular space for a flow of medium passing from said sub-assemblies through said openings of said side.

---

**4,147,209**

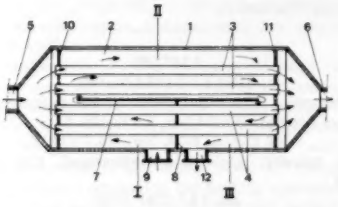
## CORROSION RESISTANT HEAT EXCHANGER

**Ake K. Persson, Hofors, Sweden, assignor to SKF Industrial Trading and Development Company B.V., Jutphaas, Netherlands**

**Continuation of Ser. No. 608,210, Aug. 27, 1975, abandoned. This application Aug. 19, 1977, Ser. No. 825,983**

**Int. Cl.[2] F28F** *9/22*

**U.S. Cl. 165—161** **16 Claims**




1. In a heat exchanger for heat transfer between first and second mediums, the heat exchanger including a plurality of generally parallel tubes for flow therethrough of said first medium through said tubes and an outer jacket formed by walls surrounding and defining therein a heat transfer space for said second medium to flow about and in contact with said tubes which extend through said heat transfer space and through the jacket walls, the improvement in combination therewith comprising wall means dividing said heat transfer space into three regions, designated I, II and III, through which said tubes extend, the tubes which extend through region I being the same tubes extending through region III, said wall means comprising a first wall portion extending substantially parallel to said tubes and substantially region II from regions I and III said first wall portion having opposite ends each extending toward but spaced from one of said jacket walls, and a second wall portion extending transversely from said first wall portion to said jacket wall and separating region I from region III, said improvement further comprising fluid inlet and outlet means in each of said regions for establishing a direction of second medium flow through each region and for forming a continuous passage from region I to II to III, said tubes being oriented in said regions such that the direction of first medium flow in the tubes is (a): in regions I and III generally opposite the flow direction of the second medium through this region, producing counter-flow heat transfer therebetween, and (b) in region II generally the same as the flow direction of the second medium in this region, producing parallel flow heat transfer therebetween.

---

**4,147,210**

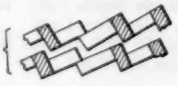
## SCREEN HEAT EXCHANGER

**Vladimir G. Pronko, Bolshoi Kozlovsky pereulok, 11, kv. 42; Evgeny V. Onosovsky, ulitsa Zoi i Alexandra Kosmodemianskikh, 8/7, kv. 131; Albert V. Chuvpilo, 3 Mytischinskaya ulitsa, 14a, kv. 86; Irina N. Zhuravleva, 4 Parkovaya ulitsa, 24, kv. 6; Viktor A. Korneev, Nagatinskaya ulitsa, 89, kv. 4; Dmitry A. Klimenkov, Chongarsky bulvar, 14, korpus 2, kv. 31; Galina M. Smirnova, ulitsa Vvedenskogo, 11, korpus 1, kv. 7; Vladimir V. Usanov, Novodevichy proezd, 2, kv. 5; Jury I. Ivanov, Obolensky pereulok, 9, korpus 3, kv. 15; Boris A. Chernyshev, Seleznevskaya ulitsa, 40, kv. 10; Vasily D. Nikitkin, Tsvetnoi bulvar, 25, kv. 95, all of Moscow; Anatoly F. Nikolaev, Shkolnaya ulitsa, 5, kv. 42, Leningrad; Maya S. Trizno, Kirovsky prospekt, 16, kv. 32, Leningrad; Valery G. Karkozov, Bolshaya Porokhovskaya ulitsa, 45, kv. 237, Leningrad; Tatyana J. Verkhoglyadova, prospekt Kosmonavtov, 92, kv. 137, Leningrad; Evgeny V. Moskalev, ulitsa Primakova, 16, kv. 15, Leningrad, and Lidia I. Yakovleva, Vsevolzhsky raion, poselok Kuzmolova, Korotky pereulok, 8, Leningradskaya oblast, all of U.S.S.R.**

**Filed Aug. 3, 1976, Ser. No. 711,507**

**Int. Cl.[2] F28F** *1/44*

**U.S. Cl. 165—165** **2 Claims**



1. A screen heat exchanger having anisotropic heat conductivity comprising: a plurality of spacers having holes defining passages for fluids for heat exchange therebetween; screens made of a sheet material having a heat conductivity higher than that of said spacers, said spacers and said screens being arranged alternately and being rigidly connected into a bank; said screens including a plurality of elements forming a plurality of meshes on said screens, said elements being disposed within the space of each passage in the direction of heat transfer from one fluid to another fluid and inclined with respect to the place of said screens at an angle substantially in the range between 45° and 90°, said elements of adjacent screens extending within one another without making contact; and at least two headers communicating with the passages of said bank and secured to the opposed ends of the bank for distributing the fluids along the passages of said bank.

---

**4,147,211**

## ENHANCED OIL RECOVERY PROCESS UTILIZING A PLURALITY OF WELLS

**Burton B. Sandiford, Placentia, Calif., assignor to Union Oil Company of California, Brea, Calif.**

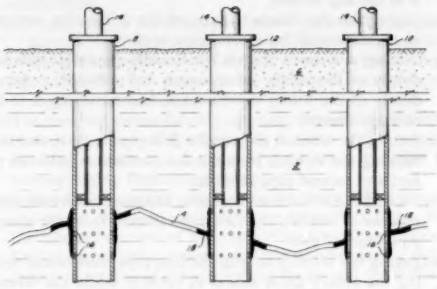
**Continuation-in-part of Ser. No. 705,623, Jul. 15, 1976, abandoned. This application Nov. 30, 1977, Ser. No. 855,948**

**Int. Cl.[2] E21B** *33/138, 43/20*

**U.S. Cl. 166—270** **13 Claims**

1. In the process of carrying out an enhanced oil recovery process in a subterranean oil-bearing reservoir of heterogeneous permeability having a high permeability zone wherein a drive fluid is injected into said reservoir via one or more injection wells and oil and/or gas is produced via one or more production wells, the improvement which comprises forming a plug in the reservoir adjacent each injection well which is in communication with the high permeability zone and in the

reservoir adjacent each production well which is in communication with the high permeability zone, the plug formed occupying about 1 to 20 percent by volume of the high permeability



zone, by injecting into the reservoir via each injection well and via each production well about 1 to 200 barrels of an aqueous solution of a plug-forming composition per vertical foot of the high permeability zone to be treated per well treated.

---

**4,147,212**

## CONTROL OF HYDROGEN SULFIDE GAS TO REDUCE TOXICITY AND CORROSION DUE TO EXPOSURES THERETO

**Vernon R. Tisdale, Homewood, Ill., assignor to The Sherwin-Williams Co., Cleveland, Ohio**

**Filed Mar. 27, 1978, Ser. No. 890,371**

**Int. Cl.**[2] **B01D** *53/34;* **C01B** *17/20;* **C01G** *9/08;* **C09K** *7/04*

**U.S. Cl. 166—244 C** **5 Claims**

1. A process for removal of sulfides in well drilling and packing fluids containing an aqueous phase which has been exposed to sorption of hydrogen sulfide gas which comprises including therein an amount of water soluble zinc ammonium carbonate complex at least stiochiometrically sufficient to precipitate substantially all of said sulfide ion then present in said fluid.

5. A method of removal of hydrogen sulfide gas from gases containing objectionable amounts of said sulfide gas by subjecting said gas to intimate contact and wash with an aqueous solution of a zinc ammonium carbonate complex wherein the complex contains a substantial proportion of zinc tetra ammonium carbonate and recovering said washed gas substantially free from said sulfide gas contaminant.

---

**4,147,213**

## COMBUSTION AIR INJECTION WELL

**Frank H. Hollingsworth, Tulsa, Okla., assignor to Standard Oil Company (Indiana), Chicago, Ill.**

**Filed Feb. 22, 1978, Ser. No. 880,262**

**Int. Cl.**[2] **E21B** *43/24, 33/14*

**U.S. Cl. 166—256** **7 Claims**

1. A method of completing a combustion air injection well comprising:

assembling an outer casing string having a lower portion of a first diameter and an upper portion having a second diameter larger than said first diameter, said upper and lower portions connected by a short swage,

forming threads on the inner surface of the top of said lower portion,

positioning said casing string in a borehole with said swage located above a predetermined air injection level and below a predetermined divertent fluid injection level,

assembling an inner casing string of essentially the same diameter as the diameter of said lower portion of said casing string,

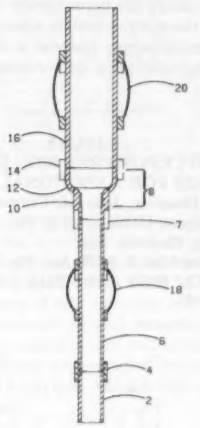
forming threads on the outer surface of the lower end of the inner casing having dimensions which mate with the threads formed on the inner surface of the lower portion of said casing string, and

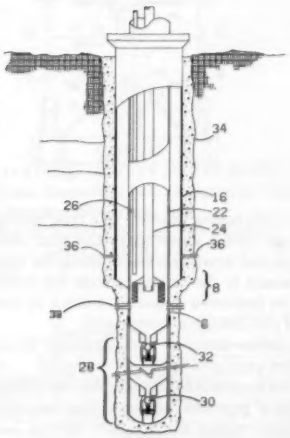
positioning said inner casing within said outer casing string so that said inner and outer threads match and screwing said inner casing into said outer casing.

5. A combustion air injection well comprising:

a borehole in the earth extending at least to a predetermined air injection depth within a hydrocarbon-bearing formation;

an outer casing string extending from the surface of the earth




to said air injection depth comprising a lower portion of a first diameter, an upper portion of a second diameter larger than said first diameter, and a short swage connecting said upper and lower portions, said swage positioned above said air injection depth and below a predetermined divertent fluid injection depth; and

an inner casing string having a diameter substantially the same as said first diameter, positioned within said upper portion of said outer string extending from the surface of the earth to said swage and connected to the upper end of said lower portion by means of a threaded connection.

**4,147,214**

## TANNIN MATERIALS AS ADDITIVES IN OIL RECOVERY PROCESSES INVOLVING CHEMICAL RECOVERY AGENTS

George Kalfoglou, Houston, Tex., assignor to Texaco Inc., New York, N.Y.

Filed Dec. 12, 1977, Ser. No. 859,423
Int. Cl.[2] E21B *43/22*
U.S. Cl. 166—273 6 Claims

1. In a method for recovering oil from a subterranean formation containing oil and having an injection well and a production well wherein a surfactant solution is injected into the injection well in order to drive the oil to the production well wherein it is produced the improvement which comprises:

injecting into the injection well in admixture with the surfactant a synthetic tanning material in amounts effective for reducing the adsorption of surfactant on the reservoir matrix.

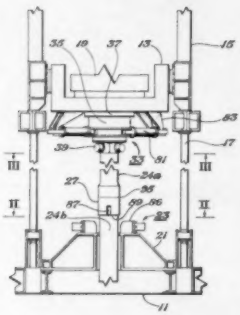
---

**4,147,215**

## INDEPENDENTLY POWERED BREAKOUT APPARATUS AND METHOD FOR A SECTIONAL DRILL STRING

Lee R. Hodge, Houston; John M. Crowell, Friendswood, and Richard A. Rogers, Houston, all of Tex., assignors to Hughes Tool Company, Houston, Tex.

Filed Mar. 9, 1978, Ser. No. 884,870
Int. Cl.[2] B25B *17/00*; E21B *3/00, 19/16*
U.S. Cl. 166—315 14 Claims



1. In an earth boring machine of a type having a mast, movable carriage means mounted to the mast and powered for generally up and down movement along the mast, rotary drive means mounted in the carriage means for rotating a string of drill pipe, an improved means for making up and breaking out sections of the drill pipe, comprising:

wrench means mounted to the carriage means for gripping the first section of pipe;

slip means mounted to the machine for gripping the second section of pipe and for supporting the drill string;

the wrench means being power driven for breaking the connection of the first pipe section with respect to the second pipe section;

the wrench means and the rotary drive means being capable of a selected amount of rotational displacement with respect to each other while the wrench means is gripping the first pipe section, for making up and breaking out the connection of the first pipe section with the rotary drive means.

14. A method of removing drill pipe from a borehole with an earth boring machine of a type having a mast, movable carriage means mounted to the mast, rotary drive means mounted in the carriage means for rotating a string of drill pipe, power means for moving the carriage means generally up and down the mast to move the drill pipe through a work table and in a borehole, and slip means mounted at the work table for gripping a pipe section and supporting the drill string, comprising:

pulling the drill string upward with the carriage means until the connection between the first and second pipe sections is at the slip means;

engaging the slip means to support the drill string and prevent rotation of the second pipe section;

providing a wrench that is rotationally powered independently of the rotary drive means and rotatable independently of the rotary drive means, and mounting it to the carriage means;

actuating the wrench to grip the first pipe section and then rotating the wrench to break the connection between the first and second pipe sections;

retracting the wrench and rotating the rotary drive means in reverse to remove the first pipe section from the second pipe section; then

engaging the wrench to grip the first pipe section and rotating the rotary drive means in reverse while the wrench restrains the first pipe section from movement, to breakout the first pipe section from the rotary drive means.

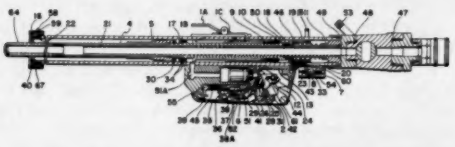
---

**4,147,216**

## PENETRATOR/NOZZLE ARRANGEMENT

Robert W. Schnepfe, Jr., Upperco, and Laban R. Lowe, Sr., White Hall, both of Md., assignors to AAI Corporation, Cockeysville, Md.

Filed May 10, 1977, Ser. No. 795,478
Int. Cl.[2] A62C *31/22*; B67B *7/24*
U.S. Cl. 169—70 10 Claims



1. A penetrator/nozzle arrangement comprising

a nozzle having a discharge end,

a tubular cutter slidable as a free body projectile about said nozzle and forcibly drivable into a target at the discharge end of said nozzle,

said nozzle being telescopic,

and latent explosive energy means for imparting abrupt forward high velocity impact motion to said cutter.

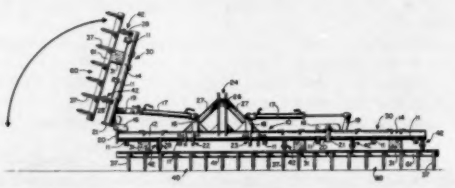
---

**4,147,217**

## FOLDABLE HARROW

Columbus W. Hawkins, Jr., Route 3, Box 165, Oak Grove, La. 71263

Filed Sep. 12, 1977, Ser. No. 832,334
Int. Cl.[2] A01B *73/00*
U.S. Cl. 172—662 3 Claims



1. A harrow device characterized by including

(i) a supporting frame adapted to be connected to a draft source, said supporting frame having a plurality of laterally positioned rigid supporting sections, each hinged to its laterally adjacent section, said supporting frame being

composed of an inboard section and two outboard sections, one of which is on each side of the inboard section;

(ii) a plurality of working sections corresponding to the respective supporting sections, said working sections each comprising

(a) a plurality of tandemly positioned elongated transverse harrow bars secured together for independent vertical and pivotal motion with respect to each other, and

(b) a plurality of downwardly disposed harrow teeth secured to said harrow bars;

(iii) connecting means flexibly securing the working sections to their corresponding supporting sections so that when a working section is in harrowing position it underlies its corresponding supporting section;

(iv) first fluid actuated driving means connected between one of the outboard sections of the supporting frame and the inboard section of the supporting frame, and second fluid actuated driving means connected between the other outboard section of the supporting frame and the inboard section of the supporting frame so that each one of the outboard supporting sections together with its corresponding working section can be independently rotated as a unit around a longitudinal axis between prone and upstanding positions;

(v) butt plates positioned between and carried by the respective laterally adjacent sections of the supporting frame, said butt plates being in registration when the supporting frame is in prone position; said driving means of (iv) being adapted to force and maintain said butt plates in registration when the supporting frame is in prone position and at other preselected times to effect the rotation of the outboard section of the supporting frame and its corresponding outboard working section as specified in (iv);

(vi) individual spacer means mounted on the undersides of the respective supporting sections so that each spacer means is interposed between a supporting section and its corresponding working section, said spacer means separating the supporting section from its underlying working section by a predetermined distance when the harrow device rests in prone position upon a flat surface; and

(vii) attachment means mounted on the forward end of the inboard section of the supporting frame enabling the entire supporting frame to be detachably attached to and propelled by the draft source and to be raised and lowered by and tilted forwardly and rearwardly by driving means of the draft source;

the connecting means of (iii) being further characterized in that they are linearly extendible to a predetermined length such that when the supporting frame is raised by driving means of the draft source, working sections in prone positon can be suspended below their corresponding supporting sections by a predetermined distance substantially in excess of the predetermined distance of (vi).

---

**4,147,218**

## BULLDOZER ATTACHMENT FOR FOUR-TRACKED TRACTOR

**Robert N. Stedman, Chillicothe, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.**

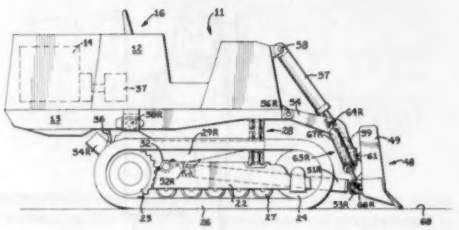
**Filed Sep. 29, 1977, Ser. No. 837,773**
**Int. Cl.[2] E02F *3/76***
**U.S. Cl. 172—803** **10 Claims**

1. A bulldozer attachment for a crawler vehicle which has a body riding on four side-by-side track assemblies wherein the right-side pair of said track assemblies are coupled to said body through a right suspension frame member situated between said right-side pair of track assemblies and wherein a left-side pair of said track assemblies are coupled to said body through a left suspension frame member situated between said left-side pair of track assemblies, comprising:

a bulldozer blade having a right-side portion and a left-side portion,

right and left push arms extending backward from said blade and respectively having first and second universal coupling means at the back ends for coupling to said right and left suspension frame members respectively, and having third and fourth universal coupling means for coupling the forward ends of said right and left push arms respectively to the back of said blade at intermediate locations thereon which are spaced inwardly from said right- and left-side portions respectively of said blade,

a mounting member having a forward end coupled to the back of said blade by fifth universal coupling means situ-



ated equidistantly from said third and fourth universal coupling means and above the level thereof, said mounting member having pivot means at the back end for pivotable attachment to said vehicle body to enable vertical pivoting movement of said mounting member,

a lift cylinder connected to said mounting member and having means for connection to said vehicle body, and

right and left stabilizing links coupled between said mounting member and said right- and left-side portions respectively of said blade.

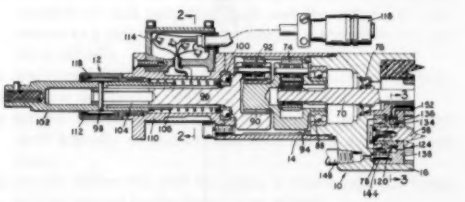
---

**4,147,219**

## TWO-SPEED OFFSET NUTRUNNER

**William K. Wallace, Barneveld, N.Y., assignor to Chicago Pneumatic Tool Company, New York, N.Y.**

**Filed Nov. 21, 1977, Ser. No. 853,497**
**Int. Cl.[2] B23Q *5/027***
**U.S. Cl. 173—12** **10 Claims**



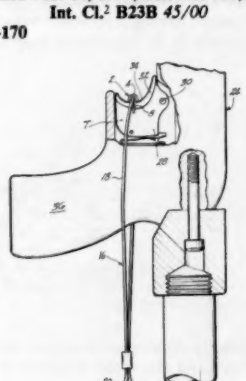
1. A two-speed pneumatically powered rotary nut runner including an output spindle adapted for rotation of a drive shank engageable with a threaded fastener, an auxiliary motor, a main motor axially offset from the auxiliary motor and being drivingly connected thereto by a rotatable reduction gear cage the rotational speed of the cage being less than that of the main motor, an intermediate spindle drivingly connected to the auxiliary motor, and a forward gear cage enclosing planetary gearing interconnecting the intermediate spindle to the output spindle.

**4,147,220**

## CONNECTOR FOR LANYARD WIRE TO CLIP OVER TRIGGER

**Walter L. Swiderski, Jr., East Haven; John J. O'Brien, Hamden, and Stuart D. Kershner, Bethany, all of Conn., assignors to Olin Corporation, New Haven, Conn.**

**Filed Feb. 18, 1977, Ser. No. 770,255**
**Int. Cl.[2] B23B *45/00***
**U.S. Cl. 173—170** **4 Claims**



**1.** A trigger actuating assembly for use with a powder-actuated tool having a trigger, which tool is mounted on a pole for use overhead, said assembly comprising: a tubular member adapted to be positioned in contact with the finger-contacting surface of the trigger, said member including means for releasably attaching said member to the trigger; and a pull wire member extending through said tubular member, said pull wire member forming a loop which can be loosely draped around the butt end of the tool.

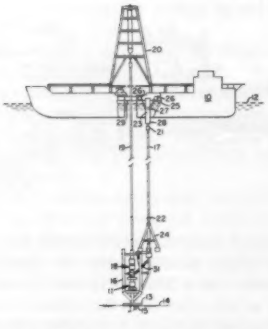
---

**4,147,221**

## RISER SET-ASIDE SYSTEM

**William T. Ilfrey; Joe K. Heilhecker, and Leo D. Maus, all of Houston, Tex., assignors to Exxon Production Research Company, Houston, Tex.**

**Continuation-in-part of Ser. No. 732,835, Oct. 15, 1976, abandoned. This application Aug. 4, 1977, Ser. No. 821,853**
**Int. Cl.[2] E21B *15/02***
**U.S. Cl. 175—7** **40 Claims**



**1.** A riser system extending from a floating drilling vessel to a subsea well having a wellhead comprising

a substantially vertical riser pipe having its upper end supported on said vessel;

subsea support means positioned in the vicinity of said wellhead, the lower end of said riser being supported by said support means;

means for moving the lower end of the riser between a first position on said support means and a second position on said support means so that the riser in the first position is in axial alignment with the wellhead and the riser in the second position is laterally removed from axial alignment with the wellhead; and

means aboard said vessel for maintaining the riser pipe in tension.

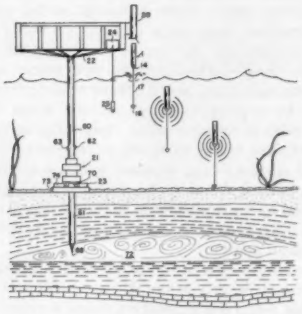
---

**4,147,222**

## ACOUSTICAL UNDERWATER COMMUNICATION SYSTEM FOR COMMAND CONTROL AND DATA

**Hudson T. Patten, Westlake Village, and Floyd B. Woodcock, Oxnard, both of Calif., assignors to Bunker Ramo Corporation, Oak Brook, Ill.**

**Division of Ser. No. 636,033, Nov. 28, 1975, Pat. No. 4,065,747. This application Sep. 6, 1977, Ser. No. 830,582**
**Int. Cl.[2] E21B *15/02***
**U.S. Cl. 175—9** **6 Claims**



**1.** An early warning blowout detection system for a well drilling operation using a drill bit and well drilling structure to drill a hole in the earth from a wellhead under a body of water, said operation being controlled from a platform on the surface of said water, said detection system comprising

first transducer means at said wellhead responsive to sound and seismic waves propagated from the drill bit at the point of entering the earth to said wellhead through the earth and well drilling structure for generating an electrical signal indicative of the frequency and amplitude of said sound and seismic waves,

circuit means at said wellhead for processing said electrical signal to produce a first alarm signal indicative of a blowout emerging from the point of said drill bit penetrating a high-pressure gas pocket,

means responsive to said first alarm signal for transmitting a coded signal from said wellhead to said platform,

second transducer means suspended in said water from said platform for detecting said coded signal,

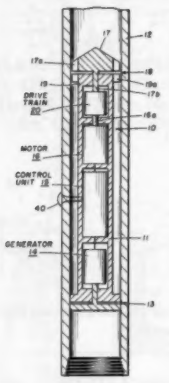
decoding means on said platform connected to said second transducer for decoding said coded signal, and

means responsive to said decoding means for alerting an operator.

## 4,147,223
## LOGGING-WHILE-DRILLING APPARATUS

**Bobbie J. Patton, Dallas, Tex., assignor to Mobil Oil Corporation, New York, N.Y.**

**Filed Mar. 29, 1976, Ser. No. 671,638**
**Int. Cl.[2] E21B *47/00***
**U.S. Cl. 175—40** **2 Claims**




1. A logging-while-drilling tool comprising:

a housing adapted to be positioned in a drill string of an earth drilling apparatus wherein a drilling fluid which is circulated through the drill string will flow around said housing;

a rotary valve positioned on said housing so that at least a portion of the drilling fluid flowing through the drill string will flow through said valve, said valve having a shaft journaled in said housing;

a motor in said housing having a drive shaft and an operating characteristic determined by a downhole condition measured by said tool; and

a drive train connecting said drive shaft of said motor to said shaft of said rotary valve, said drive training comprising:

an asymmetrical efficient transmission for transmitting torque from said drive shaft of said motor to said shaft of said rotary valve and for preventing transmission of torque from said shaft of said rotary valve to said drive shaft of said motor; said transmission comprising:

a case;

an input shaft journaled in said case connected to to said drive shaft of said motor;

an output shaft journaled in said case connected to said shaft of said rotary valve;

a driving gear affixed to said input shaft;

at least one disc gear means journaled about an axis on said case perpendicular to the axis of said driving gear, said at least one disc gear being driven by said driving gear;

a helical thread gear carried by said at least one disc gear; and

a driven gear affixed to said output shaft and being driven by said helical thread gear.

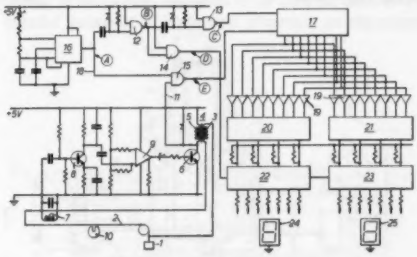
---

## 4,147,224
## BATHROOM SCALES

**Peter A. George, Harpole, and Harold Crystal, Boothville, both of England, assignors to Plessey Handel und Investments AG, Zug, Switzerland**

**Filed May 19, 1977, Ser. No. 798,481**
**Claims priority, application United Kingdom, May 20, 1976, 20900/76; Mar. 30, 1977, 13344/77**
**Int. Cl.[2] G01G *3/14***
**U.S. Cl. 177—210 FP** **9 Claims**

1. Apparatus for weight measurement comprising a wire mounted for tensioning by a weight to be measured, means for resonating said wire including a fixed anchorage point, a semi-circular pulley, in which said wire is fastened to said fixed anchorage point and is stretched over said pulley and connected to a spring loaded anchorage point, said weight being applied to said wire via said spring loaded anchorage point, means for measuring the frequency of resonation, at least one



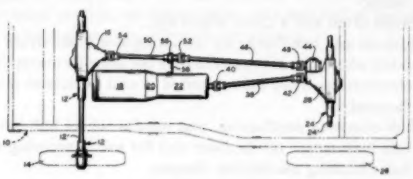

programmable read only memory (PROM) fed from the means for measuring the frequency of resonation and programmed to provide output signals indicative of the weight applied to the wire, and digital display means connected to said output signals from said PROM.

---

## 4,147,225
## VEHICLE DRIVE SYSTEM

**Philip J. Mazziotti, Toledo, Ohio, and Donald E. Hobson, Grabill, Ind., assignors to Dana Corporation, Toledo, Ohio**

**Filed Feb. 17, 1978, Ser. No. 878,827**
**Int. Cl.[2] B60K *17/34, 23/04***
**U.S. Cl. 180—44 R** **3 Claims**



1. In a vehicle having front and rear drive wheels, the improvement comprising:

an engine driven first propeller shaft;

a first differential unit having an input shaft with one end coupled to said propeller shaft and the other end connected to a pinion gear for transmitting torque to the rear drive wheels;

a first crossed-axis drive gear mounted on said input shaft;

an output shaft;

a second crossed-axis drive gear mounted on said output shaft laterally of and meshed with said first crossed-axis gear;

a second differential unit including a pinion gear for transmitting torque to the front drive wheels;

a second propeller shaft coupling said output shaft to said second differential unit pinion gear and;

means for selecting one of a plurality of predetermined angular relationships between said input shaft and said output shaft, said means including a gear case for housing said output shaft and said second crossed-axis gear, said gear case having a plurality of bolt receiving holes formed therein, and a plurality of bolts inserted through said holes and threadably engaged with one of at least two sets of internally threaded holes in said first differential unit.

**4,147,226**

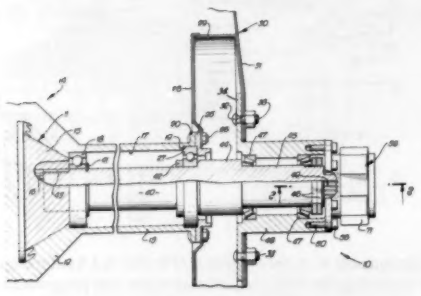
## LOCK-IN LOCK-OUT REAR HUB POWER ASSEMBLY

**Richard M. Kleespies, 3780 El Camino, and Fred F. Parke, 3993 Mountain Ave., both of San Bernardino, Calif. 92404**

**Filed Jun. 30, 1977, Ser. No. 811,688**

**Int. Cl.[2] B60K *25/00***

**U.S. Cl. 180—70 R** **2 Claims**



**1.** A lock-in lock-out rear hub power assembly for a wheeled vehicle comprising the combination of:

a differential axle driving mechanism provided on said vehicle;

elongated axle means making a rotary driven connection at its inner end with said mechanism;

bearing and housing means on said vehicle within which a substantial inner portion of said axle means journals and by which it is enclosed, a substantial integral outer portion of said axle means extending axially outward from within said bearing and housing means;

a tubular drive wheel hub radially flanged at its inner end and rotatably mounted on said outer portion of said axle means;

a brake drum and a drive wheel disc;

means on said hub flange for mounting said brake drum and drive wheel disc in approximately the same locations these elements are drive axle mounted in said vehicle as manufactured;

a hub clutching mechanism, said tubular wheel hub having bolt hole means on its outer end for use in securing said hub clutching mechanism thereto;

said outer axle portion having spline means for engaging said clutching mechanism to provide an optional lock-in, lock-out rear hub power assembly with respect to said drive wheel and said brake drum of said vehicle.

---

**4,147,227**

## STANDARD MODEL TRACTOR WITH REMOVABLE SECOND SET OF OPERATING CONTROLS

**Cornelis van der Lely, 7, Bruschenrain, Zug, Switzerland**

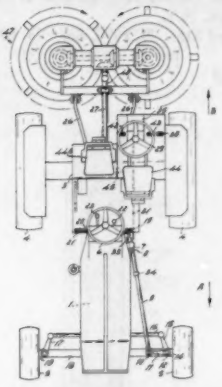
**Filed Apr. 12, 1977, Ser. No. 786,850**

**Claims priority, application Netherlands, Apr. 15, 1976, 7604010**

**Int. Cl.[2] B60K *26/02*; B60N *1/02***

**U.S. Cl. 180—77 C** **12 Claims**

**1.** A tractor which comprises: driven wheels; two driver's seats, one of said seats facing the rear and being disposed between the longitudinal plane of symmetry of the tractor and one of said driven wheels of the tractor, the other of said seats facing forward and being disposed so that said plane of symmetry passes therethrough; permanent controls for the tractor thereon which are associated with said other seat, said permanent controls including a first steering device; duplicate controls for the tractor mounted thereon which are associated with said one seat, said duplicate controls including a second steering device which is detachably coupled to said first steering device, said duplicate controls being readily detachable from said tractor as a unit; said one seat being located between



said permanent controls and said second steering device as seen from a side of the tractor.

---

**4,147,228**

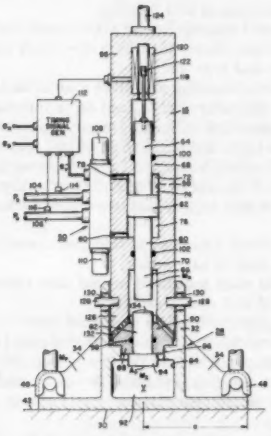
## METHODS AND APPARATUS FOR THE GENERATION AND TRANSMISSION OF SEISMIC SIGNALS

**John V. Bouyoucos, Rochester, N.Y., assignor to Hydroacoustics Inc., Rochester, N.Y.**

**Filed Oct. 7, 1976, Ser. No. 730,752**

**Int. Cl.[2] G01V *1/14***

**U.S. Cl. 181—119** **37 Claims**



**1.** The method of generating a seismic transmission having an energy spectrum extending over a frequency range for use in a seismic exploration system, comprising the steps of

(a) generating a plurality of sequences of pulses which are transmitted, which pulses are swept monotonically in repetition frequency, each sequence having a different lower pulse repetition frequency and a different upper pulse repetition frequency, said repetition frequencies falling within said frequency range, each of said pulses in any one of said sequences having a useful energy spectrum which extends beyond the highest repetition frequency of the sequence in which it is contained, and

(b) controlling the variation of the energy and timing of said pulses within any one of said sequences, and with respect to all of said sequences, such that the mean variation in the

energy spectrum level over said frequency range is minimized for said transmission of all said sequences.

18. The method of generating seismic signals for use in a seismic exploration system comprising the steps of

(a) generating a sequence of pulses which sweep in repetition frequency during a transmission over a first band, and

(b) modulating said sweep at a rate which varies over a frequency range which is below said first band.

---

**4,147,229**

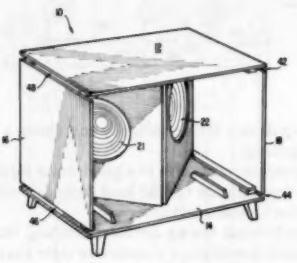
## VIBRATILE MODE SPEAKER CABINET

**Arthur L. Flashman, 139 Cocoa Pl., Cocoa, Fla. 32922**

**Filed Oct. 14, 1977, Ser. No. 842,045**

**Int. Cl.[2] H05K** *5/00*

**U.S. Cl. 181—144** **10 Claims**



1. A cabinet for housing sound reproduction transducers of the type having fixed frames and movable cones therein, said cabinet comprising in combination:

a plurality of cabinet members, including a base member, a top member and side members, each positioned to form an external surface of a generally open cabinet which defines therein a cabinet void having a front opening and a rear opening, with each of said cabinet members formed of a relatively thin and acoustically stiff material for moving in a vibratile mode when energized, with adjacent ones of said cabinet members defining therebetween generally continuous isolation slots for permitting the independent vibratile motion of said cabinet members;

a plurality of nodal coupling members, each attached between adjacent ones of said cabinet members for transmitting vibratile energy across said isolation slots, thereby energizing said vibratile modes of each of said cabinet members; and

speaker mounting means, located generally within said cabinet void and coupled between the frames of the sound reproduction transducers and at least one of said cabinet members so that the sound reproduction transducers are located within said cabinet void for directionally radiating accoustical energy outwardly through said front and rear openings thereof, said speaker mounting means for coupling the vibrational energy from the frames of the sound reproduction transducers into said cabinet members for energizing said vibratile modes thereof, whereby the audio energy radiated from the sound reproduction transducers will be supplemented by vibratile mode energy radiated from said cabinet members.

---

**4,147,230**

## COMBINATION SPARK ARRESTOR AND ASPIRATING MUFFLER

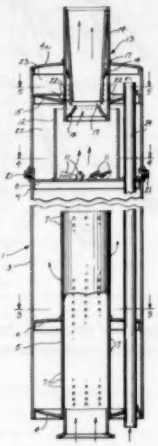
**Theodore W. Ormond, and Kenneth J. Kicinski, both of Stoughton, Wis., assignors to Nelson Industries, Inc., Stoughton, Wis.**

**Filed Apr. 14, 1978, Ser. No. 896,183**

**Int. Cl.[2] F01N** *3/02, 3/06*

**U.S. Cl. 181—231** **11 Claims**

1. A combined spark arrestor and aspirating muffler, comprising an outer body having exhaust gas inlet means for receiving exhaust gases from an engine and having gas outlet means for discharging gases from the body, a baffle disposed transversely across the body and having a plurality of openings therein, a tubular member located radially outward of the openings and secured to the downstream side of the baffle, means operably connected to the openings for causing exhaust gas passing through said openings to be swirled outwardly in said tubular member, a collection chamber communicating



with the peripheral portion of the downstream end of the tubular member to collect solid particles from the exhaust gases, a venturi establishing communication between the central portion of the downstream end of the tubular member and said outlet means, said venturi having a throat portion disposed within the body, and an air inlet conduit communicating with the throat portion, air being drawn into said throat portion as the exhaust gases pass through the venturi.

---

**4,147,231**

## LADDER STABILIZING DEVICE

**Douglas A. Chantler, 33 Magwood Ct., Toronto, Ontario, Canada (M6S 2M4), and Ross W. Coleman, 5 Groomsport Crescent, Agincourt, Ontario, Canada**

**Filed Sep. 26, 1977, Ser. No. 836,914**

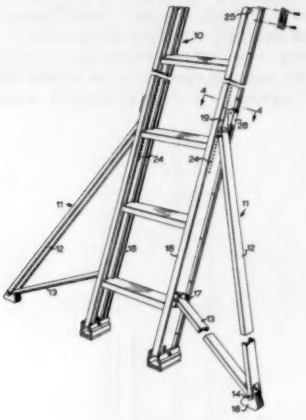
**Claims priority, application Canada, Sep. 27, 1976, 262111**

**Int. Cl.[2] E06C** *1/16, 5/36*

**U.S. Cl. 182—172** **12 Claims**

1. Stabilizing means for connection on the outer side of each side piece of a ladder comprising a lower leg part adapted to be pivotally connected on the side piece, an upper leg part pivotally connected to the lower leg part, a reaction member for connection on the side piece above the lower leg part, rotatable means connected to the upper leg part and having an axis of rotation, said rotatable means rotating in engagement with

the reaction member to shift the reaction member upwardly relative to the axis of rotation and the upper leg part, and



releasable retaining means for retaining the rotatable means in fixed position relative to the reaction member.

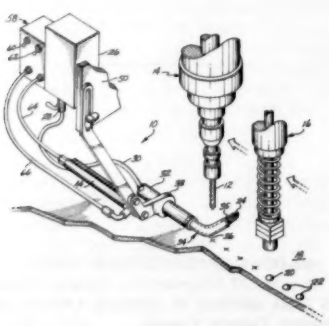
---

**4,147,232**

## LUBRICANT APPLICATOR

**Frank L. Gaunt, Puyallup; Horace E. Hill, Renton, and Mark S. Soderberg, Kirkland, all of Wash., assignors to Boeing Commercial Airplane Company, Seattle, Wash.**

**Filed May 16, 1977, Ser. No. 777,247**
**Int. Cl.[2] F01M *11/00***
**U.S. Cl. 184—1 E** **19 Claims**



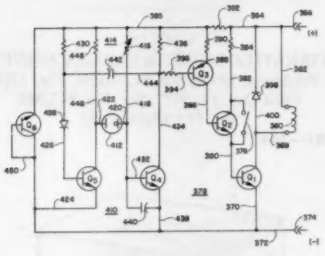
**17.** A method of lubricating a drill bit of an automatic riveter which sequences a drilling and a riveting cycle with the drilling tool and the rivet setting tool moving laterally to allow positioning of the proper tool, the steps comprising: extending an absorbent pad from an end of a container, introducing a lubricant into the container, slidably mounting the container to a support structure, introducing a resilient member between the structure and the container, and positioning the container along the line of and near the end of lateral movement of a drilling tool.

**4,147,233**

## TIMING CIRCUIT FOR A CHASSIS LUBRICATOR

**Roy B. Smith, 3480 NE. 62, Washington Court House, Ohio 43160**

**Filed Aug. 16, 1976, Ser. No. 714,622**
**Int. Cl.[2] F17D *3/00*; H01H *3/26*; F16N *11/10, 13/16***
**U.S. Cl. 184—29** **5 Claims**



**1.** A timing device for periodically energizing a load from a source comprising:

switching means responsive to a given input signal for effecting the energization of said load from said source;

logic network means including:

an electrochemical timing device exhibiting, from an initial conductive condition, a conductive state over a predetermined first interval upon the passage of a predetermined value of current there through in a designated first directional sense and exhibiting a substantially non-conductive state to said current of first directional sense at the termination of said interval, said device being responsive to the passage of current of predetermined value there through in a second directional sense to transition from said non-conductive state to said initial state within a predetermined second interval,

a first transistor stage operatively associated with said switching means and said timing device and having a conducting mode deriving said switching means input signal when said timing device is in said non-conducting state, and having a non-conducting mode when said timing device is in said conductive state,

a second transistor stage operatively associated with said timing device and responsive to a given input signal to exhibit a conducting mode effecting said current passage in said first directional sense to derive said timing device conductive state and having a non-conducting mode during said passage of current of second directional sense through said timing device; and

R-C timing network means for deriving said given input signal to said second transistor stage at the termination of a predetermined second interval commencing with the termination of said first interval.

---

**4,147,234**

## METHOD AND SYSTEM OF LUBRICATING A PLURALITY OF COMPRESSED AIR OPERATED DEVICES

**Josef Lewkowicz, Ektorp, and Torsten O. Larsson, Karlskoga, both of Sweden, assignors to Atlas Copco AB, Nacka, Sweden**

**Filed Apr. 21, 1976, Ser. No. 678,981**
**Claims priority, application Sweden, Apr. 24, 1975, 75047605**
**Int. Cl.[2] F01M *1/00, 1/16***
**U.S. Cl. 184—6.26** **12 Claims**

**1.** Lubricant furnishing system for a plurality of compressed air operated devices **(11–16)** that are independently supplied with compressed air through air supply lines **(17–22)** controlled by air supply valves **(23–28)**, comprising:

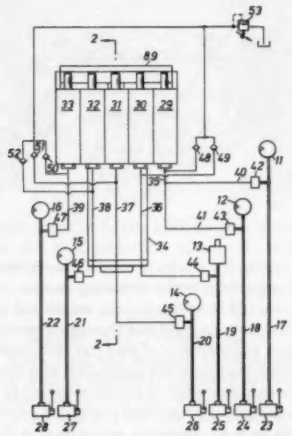
a lubricant supply line **(36–41)** coupled to each air operated device,

a plurality of pumps (29–33) for supplying predetermined metered flows of lubricant to the lubricant supply lines,

normally closed shut-off valves (42–47) in said lubricant supply lines,

said pumps (29–33) providing said metered flows of lubricant even when said shut-off valves (42–47) are closed,

means (54) for sensing the air pressure in said air lines (17–22) downstream of the supply valves (23–28) and for positively opening the respective shut-off valves (42–47)



in response to the sensed presence of air pressure in the respective air lines being pressurized,

pressure relief valves (48–52) at least some of which are back pressure controlled check valves, connected to the lubricant supply lines to permit the respective metered flows of lubricant to escape when the respective shut-off valves (42–47) are closed, and

a common pressure relief valve (53) commonly coupled to at least some of said back pressure controlled check valves for controlling said check valves.

---

**4,147,235**

## ELEVATOR CONTROL SYSTEM

**Thomas Henry, Floral Park, and Jean Youla, Brooklyn, both of N.Y., assignors to Otis Elevator Company, New York, N.Y.**

**Filed Jul. 1, 1977, Ser. No. 812,203**

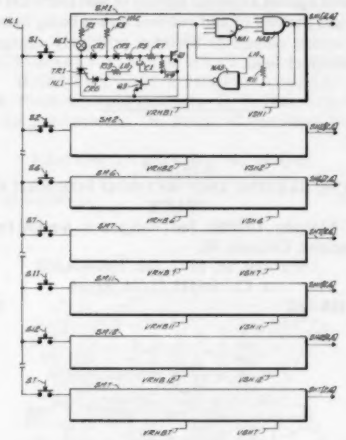
**Int. Cl.[2] B66B** *1//18*

**U.S. Cl. 187—29 R** **3 Claims**

1. An improved elevator control system having a plurality of cars serving an upper, a lower and a plurality of intermediate landings of a building by stopping thereat and opening their doors, said elevator system including separate primary hall call registration means for registering primary hall calls for said landings, a separate set of car call registration means associated with each of said cars for registering car calls for said landings, car position signifying means individual to each car, each producing separate car position signals signifying the position of its associated car at said landings, control equipment operating in response to registered primary hall calls and car calls to cause said cars to operate in a predetermined manner, auxiliary hall call registration means separately associated with any one of a number of said landings, each operable to register an auxiliary hall call for its associated landing, and selection means operating in response to the registration of any auxiliary hall call when all of said cars are signified as being located at landings other than the landing for which said auxiliary hall call is registered to select a car for expedited service to said auxiliary hall call, wherein the improvement comprises:

said control equipment including means operative in response to the selection of a car which is traveling toward the landing for which said auxiliary hall call is registered for causing the selected car to travel non-stop to said landing and to stop thereat and open its doors, and

said control equipment including means operative in response to the selection of a car which is traveling away



from the landing for which said auxiliary hall call is registered to cause the selected car to stop in a prescribed manner, to reverse its direction of travel and thereafter to travel non-stop to said landing and to stop thereat and open its doors.

---

**4,147,236**

## PAD WEAR INDICATING ARRANGEMENT

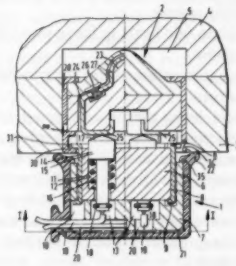
**Hermann Steffen, Neu-Isenburg, and Rolf Weiler, Frankfurt-Sindlingen, both of Fed. Rep. of Germany, assignors to ITT Industries, Inc., New York, N.Y.**

**Filed Feb. 3, 1978, Ser. No. 875,261**

**Claims priority, application Fed. Rep. of Germany, Feb. 16, 1977, 2706481**

**Int. Cl.[2] F16D** *66/02*

**U.S. Cl. 188—1 A** **27 Claims**



1. A pad wear indicating arrangement comprising:

a contact head embedded in a backing plate of a brake-shoe assembly and not projecting from the surface of said backing plate remote from a friction pad of said brake-shoe assembly, said contact head having an electrical conductor enveloped by an insulating layer and extending from said backing plate on the side of said pad;

a socket connector adapted to positively engage said contact head and provide a connection between said electrical conductor and an indicating device;

a contact element disposed to be axially slidable in said

socket connector normal to the plane of said backing plate, said contact element having an end surface extending from said socket connector into said backing plate and facing said contact head; and

a resilient means preloading said end surface of said contact element against a contact surface of said electrical conductor, said preload of said resilient means being increased as said socket connector becomes positively engaged with said contact head.

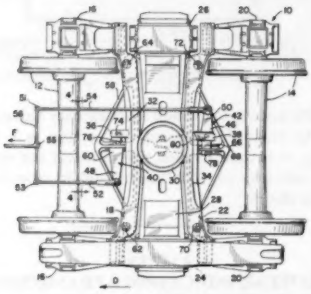
---

**4,147,237**

## BRAKING SYSTEM AND METHOD FOR RAILROAD TRUCK

**Harry W. Mulcahy, Griffith, Ind., assignor to Amsted Industries Incorporated, Chicago, Ill.**

**Filed Aug. 15, 1977, Ser. No. 824,859**
**Int. Cl.[2] B61H** *13/36, 13/38*
**U.S. Cl. 188—52** **8 Claims**



3. A braking system for a railroad car truck having a transversely positioned bolster supported at its ends in a right side frame and left side frame and a front and a rear wheelset rotatably mounted in a front swingable arm and a rear swingable arm, respectively, said arms being connected to said side frames to allow relative movement of said swingable arms with respect to said side frames, said system comprising,

means for supplying a braking force, said means connected to said braking system,

means for dividing said braking force into a first and second force component,

first and second connecting means for transferring said force components respectively,

first and second lever means connected to said first and second connecting means for converting said force components to a first and second rotatable moment,

a first pivot means provided on said first swingable arm and connected to an opposite end of said first truck lever and a second pivot means provided on said second swingable arm and connected to a middle portion of said second truck lever, and

first braking means and second braking means engageable with said first wheelset and said second wheelset, respectively, for applying a braking force thereto, said first braking means pivotally connected intermediate the ends of said first lever means and said second braking means pivotally connected at an opposing end of said second lever means,

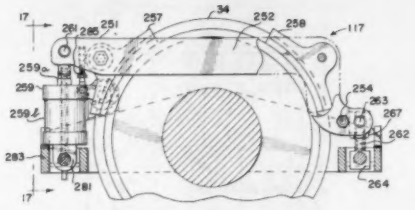
whereby said first braking means and said second braking means move horizontally with respect to horizontal movements of said swingable arms and remain aligned with said wheelsets upon an application of said braking force.

**4,147,238**

## RAIL TRACTION VEHICLE BRAKE SYSTEM

**Victor H. Ames, and Marshall V. Hartelius, both of Midlothian, Ill., assignors to Whiting Corporation, Harvey, Ill.**

**Division of Ser. No. 552,711, Feb. 24, 1975, Pat. No. 4,067,259, which is a continuation-in-part of Ser. No. 437,283, Jan. 28, 1974, Pat. No. 3,884,156. This application Nov. 23, 1977, Ser. No. 854,085**
**Int. Cl.[2] B61H** *1/00, 13/36*
**U.S. Cl. 188—57** **16 Claims**



1. A brake system for a vehicle which travels on rail wheels, said system comprising: brake actuating means; a brake arm connected at one end to said actuating means and at the opposite end to a first end of a rigid link through a secondary pivotable connection, a second end of said rigid link being mounted to a primary brake-action pivot point; first and second spaced apart brake shoes independently mounted to said brake arm for engaging a braking surface in fixed rotational relationship to a rail wheel which is in operative association with the brake system; said primary brake-action pivot point being positioned at a location which, on application of said brake actuating means in the usual operation of said brake system, will direct the brake arm through an arcuate path by which substantially simultaneous contact of said brake shoes with said braking surface is achieved; pivot restriction means associated with said secondary pivotable connection enabling said brake arm to be preferentially pivotable about said primary brake-action pivot point and urging said brake arm to maintain a fixed relationship with said rigid link, said pivot restriction means being yieldable when, on occasion, only one of said first and second brake shoes contacts said braking surface upon the continued application of said brake actuating means thereby causing said brake arm to then rock about said secondary pivotable connection until the other of said first and second brake shoes contacts said braking surface.

---

**4,147,239**

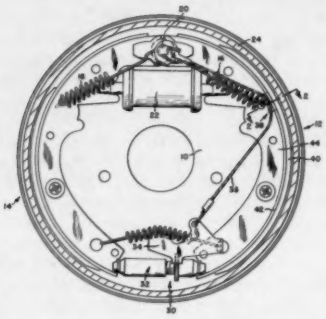
## DRUM BRAKE ASSEMBLY HAVING INTEGRAL CABLE SUPPORT

**Michael A. Kluger, South Bend, Ind., assignor to The Bendix Corporation, Southfield, Mich.**

**Filed Sep. 30, 1977, Ser. No. 838,277**
**Int. Cl.[2] F16D** *65/56*
**U.S. Cl. 188—79.5 GC** **4 Claims**

1. In a drum brake assembly having a backing plate which supports a pair of brake shoes, a hydraulic actuator which urges the pair of brake shoes into a braking position engaging a drum and an adjustment mechanism disposed between the pair of brake shoes for maintaining a running clearance between the pair of brake shoes and the drum, the improvement in which a connecting member connects with said adjustment mechanism, one of said pair of brake shoes, and said backing plate in order to actuate said adjustment mechanism when said one brake shoe moves relative to said backing plate, said one brake shoe including a projecting portion slidably engaging

said connecting member to connect said connecting member with said one brake shoe;



said one brake shoe including a friction lining which attaches to a rim and said projecting portion on said brake shoe projects from said rim.

---

**4,147,240**

## BRAKE DISC CONNECTION

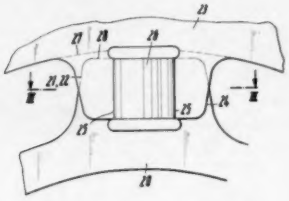
**Willi Klein, Remscheid, and Henning Rocholl, Radevormwald, both of Fed. Rep. of Germany, assignors to Bergische Stahl-Industrie, Remscheid, Fed. Rep. of Germany**

**Filed Jun. 4, 1975, Ser. No. 583,800**

**Claims priority, application Fed. Rep. of Germany, Jun. 4, 1974, 2426952**

**Int. Cl.**[2] **F16D** *65/12*

**U.S. Cl. 188—218 XL** **2 Claims**



1. A brake disc connection especially for safely applying disc brakes of rail vehicles, which includes in combination a first member forming rotatable means, a second member forming brake ring means associated with said rotatable means, each of said rotatable means and said brake ring means having at least one pair of spaced clamping surfaces defining a clamping groove, the clamping groove defined by said at least one pair of clamping surfaces in said rotatable means being located opposite to and correspondingly aligned with said at least one groove defined by said at least one pair of clamping surfaces in said brake ring means, rigid clamping strip means securely clamped directly therebetween into said aligned grooves, clamping surfaces defined by at least three pairs of aligned clamping grooves with a clamping strip means clamped within each clamping groove, each pair of oppositely located grooves being radially aligned corresponding to each other and the clamping strip means pertaining to said grooves having approximately equal portions located in said rotatable means and said brake ring means, one of said members being provided with two clamping grooves arranged one behind the other and aligned in axis-parallel direction, and the other one of said two members having one clamping groove fitting between said last mentioned two grooves, all of said clamping grooves having a height corresponding to at least the height of said clamping strip means, said clamping strip means being yieldingly bent upon brake actuation, each of said clamping strip means comprising two individual sections tapering toward each other and having means operable to pull said individual sections into and clamp the same directly in the pertaining groove having a correspondingly angular taper, the tapering angular relationship of said clamping surfaces being outside the self-locking angular relationship therewith.

---

**4,147,241**

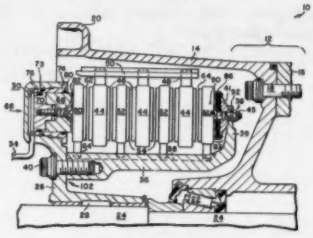
## STRUCTURALLY STRONG HEAT INSULATOR FOR HIGH TRANSIENT TEMPERATURES

**Robert B. Preniczny, and Benjamin C. P. Han, both of South Bend, Ind., assignors to The Bendix Corporation, Southfield, Mich.**

**Filed Oct. 27, 1977, Ser. No. 846,003**

**Int. Cl.**[2] **F16D** *65/847*

**U.S. Cl. 188—264 G** **10 Claims**



1. An aircraft wheel and multiple disc brake assembly having:

a wheel member to be braked rotatably mounted on said aircraft;

torque-absorbing means mounted on said aircraft for effectuating said braking of said wheel, said torque-absorbing means including a backing plate member, an axial member, and a pressure plate member axially slidable along said axial member;

rotor members and stator members located between said pressure plate member and said backing plate member, said rotor and stator members being axially slidable on said wheel member and said axial member, respectively, whereby the engagement thereof causes said braking of said wheel member; and

brake application means secured to said torque-absorbing means for urging said pressure plate member toward said backing plate member when a brake application is effected, thereby compressing said rotor and stator members between said backing plate member and said pressure plate member, said compressing of the rotor and stator members resulting in generation of heat when the wheel member is rotating, some of said heat being conducted from said rotor and stator members into said backing plate member, wherein the improvement comprises first insulation means secured to said backing plate member and connected to one of said rotor and stator members for receiving said brake application forces and for controlling the conduction of heat to said backing plate member, said first insulation means having a first plurality of sheet members defining a first insulation stack, each of said sheet members having a defined thickness of material to create opposite heat conduction surface areas at the ends of said material thickness, said first insulation stack having said surface areas adjacent said sheet members bearing against one another with one of said surface area of one of said sheet members defining the top of said first insulation stack and one of said surface area of another said sheet members defining the bottom of said first insulation stack, said top receiving said brake application forces and said heat and said bottom transmits the same to said backing plate member, each of said sheet members having a plurality of holes passing completely through its said material

thickness to reduce the amount of said material on both of said surface areas of said sheet members, said first insulation stack having at least some of said holes of said sheet members at least partially offset from said holes of adjacent sheet members whereby those of said offset holes abut some of said material of said adjacent sheet members to increase the length of the heat conduction path through said first insulation stack and thereby reduce the overall conduction of heat from said rotor or stator members into said backing plate member to allow the generation of temperature up to 1500° F. in said rotor and stator members without damage to said backing plate member.

---

**4,147,242**

## POWER TRANSMISSION FOR USE IN INDUSTRIAL VEHICLE DRIVELINE AND EQUIPPED WITH FLUID ACTUATED CLUTCHES

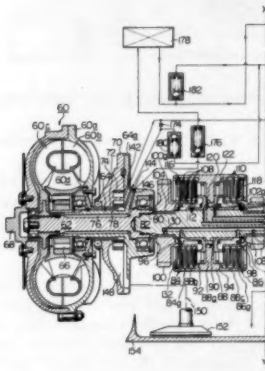
**Kazuyoshi Fujioka, Tokyo, Japan, assignor to Nissan Motor Company, Limited, Japan**

**Filed Sep. 12, 1977, Ser. No. 832,381**

**Claims priority, application Japan, Sep. 14, 1976, 51-123743[U]**

**Int. Cl.[2] F16D *67/00***

**U.S. Cl. 192—4 A** **4 Claims**



1. A power transmission for use in the driveline of an engine-powered industrial vehicle, comprising:

a torque converter connected in torque transmission relationship to the engine of the vehicle;

fluid actuated clutch means connected in torque transmission relationship to said torque converter for transmitting the torque from said torque converter to drive gearings of the vehicle, said clutch means including at least one clutch having clutch facings which operate in hydraulic fluid;

a fluid reservoir containing a hydraulic fluid;

a pump taking thereinto the hydraulic fluid from said reservoir and discharging hydraulic fluid under pressure;

clutch actuation conduit means interconnecting said pump and said clutch means;

torque converter working fluid supply conduit means interconnecting said pump and said torque converter and having arranged therein a flow restriction for restricting the supply of fluid to said torque converter;

lubrication conduit means interconnecting said torque converter and said clutch means to conduct the fluid exhausted from said torque converter to said clutch means for lubrication of said clutch facings, said lubrication conduit means having arranged therein a converter pressure regulator valve for maintaining the converter pressure at a predetermined value;

a pressure regulator valve operatively connected to said clutch actuation conduit means for regulating the hydraulic fluid pressure discharged from said pump to a predetermined value by draining said clutch actuation conduit means when the pressure therein is above a predetermined value;

a manual selector valve situated in said clutch actuation conduit means and partly defining a portion thereof, said selector valve having shift positions for distributing selectively the regulated fluid pressure to said clutch means for engagement thereof and a shift position for cutting off the supply of the regulated fluid pressure to said clutch means while draining same for thereby causing disengagement of said clutch means;

a shut-off valve situated in said clutch actuation conduit means and partly defining a portion thereof, located between said clutch means and said pressure regulator valve, said shut-off valve having a first position for providing communication between said pump and said clutch means and a second position for restricting communication between same simultaneously with draining said clutch actuation conduit means for thereby reducing the fluid pressure to be supplied to said clutch means; and branch conduit means interconnecting said pressure regulator valve and said lubrication conduit means for conducting the fluid exhausted from said pressure regulator valve to said lubrication conduit means.

---

**4,147,243**

## MULTI-SPEED TRANSMISSION HUB FOR A BICYCLE

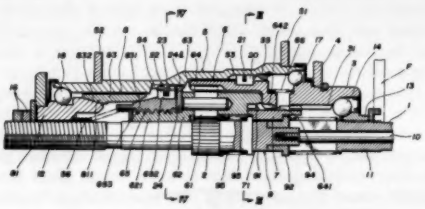
**Takashi Segawa, and Seiji Fukui, both of Sakai, Japan, assignors to Shimano Industrial Company Limited, Osaka, Japan**

**Filed Nov. 17, 1977, Ser. No. 852,345**

**Claims priority, application Japan, Nov. 27, 1976, 51/142782; Nov. 27, 1976, 51/142781**

**Int. Cl.[2] F16H *3/44*; F16D *67/00***

**U.S. Cl. 192—6 A** **3 Claims**



1. A multi-speed transmission hub for a bicycle, comprising:

a fixed shaft;

a driving member rotatably supported on said fixed shaft;

a sprocket mounted on said driving member;

a hub shell mounted with respect to said driving member in the relation of being rotatable therewith;

a multiple speed-change mechanism housed within said hub shell so as to change the rotary speed of the driving force transmitted from said driving member to the hub shell;

said speed-change mechanism comprising a sun gear provided on said fixed shaft, a gear frame having planetary gears in mesh with said sun gear, and a ring gear having inner teeth in mesh with said planetary gears;

a clutch cone screwed to said gear frame;

a control member for relaying the driving force from said driving member to said speed-change mechanism; and

a braking mechanism acting to stop the rotation of said hub shell when said driving member is reversely rotated,

said braking mechanism comprising brake shoes actuated by said clutch cone, and a brake cone for stopping the rotation of said brake shoes,

said hub being provided with, two sets of first and second inner teeth and two sets of first and second transmitting pawls, and a rotary member inserted between said clutch cone and gear frame, said first transmitting pawls of said two sets of pawls being mounted to said ring gear so as to transmit the driving

force therefrom to the hub shell when said driving member is normally rotated, said second transmitting pawls being mounted on said clutch cone so as to transmit the driving force from said gear frame to said hub shell when the driving member is normally rotated, and transmit the driving force from said hub shell to said gear frame when the hub shell is reversely rotated, said rotary member having at its outer periphery teeth in mesh with one of the two sets of inner teeth and being made rotatable always together with said hub shell, thereby restraining said clutch cone from being screwed toward said gear frame when the driving member is normally rotated and said hub shell is reversely rotated.

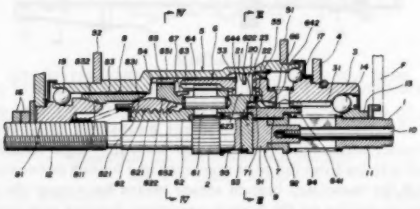
---

**4,147,244**

## MULTI-SPEED TRANSMISSION HUB

**Takashi Segawa, and Seiji Fukui, both of Sakai, Japan, assignors to Shimano Industrial Company Limited, Osaka, Japan**

**Filed Nov. 17, 1977, Ser. No. 852,346**
**Claims priority, application Japan, Nov. 27, 1976, 51/142779; Nov. 27, 1976, 51/142780**
**Int. Cl.[2] F16H *3/44;* F16D *67/00***
**U.S. Cl. 192—6 A** **5 Claims**



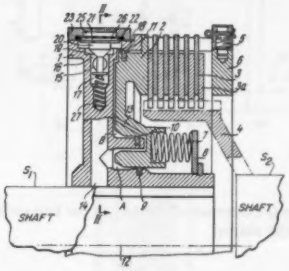
1. A multi-speed transmission hub for a bicycle, having:
a fixed shaft;
a driving member rotatably supported on said fixed shaft;
a sprocket mounted on said driving member;
a hub shell rotatably supported with respect to said driving member;
a multiple speed-change mechanism housed within said hub shell so as to change the speed of a driving force transmitted from said driving member to said hub shell,
said speed-change mechanism comprising a sun gear mounted on said fixed shaft, a gear frame having planetary gears engageable with said sun gear, a ring gear having inner teeth engageable with said planetary gears, and a clutch cone screwable with said gear frame;
a control member between said driving member and said gear frame for relaying to said speed-change mechanism the driving force transmitted from said driving member;
and a braking mechanism acting to stop the rotation of said hub shell when said driving member is reversely rotated,
said braking mechanism comprising brake shoes actuated by said clutch cone, and a brake cone for stopping the rotation of said brake shoes;
said hub being provided with first and second inner teeth provided at the inner surface of said hub shell and first transmitting members and a second transmitting member, engageable with said first and second inner teeth respectively, said first and second transmitting members transmitting the driving force from said speed-change mechanism to said hub shell, said first transmitting members comprising transmitting pawls urged by a pawl spring in the direction of disengagement from said first inner teeth, said first transmitting members being adapted to be engaged with said first inner teeth by use of differential rotary speed between said gear frame and ring gear when said driving member is normally rotated.

**4,147,245**

## HYDRAULICALLY OPERATED FRICTION CLUTCH

**Anatoly A. Folomin; Vsevolod K. Fesenko; Olgerd I. Girutsky, and Vyacheslav N. Paukh, all of Moscow, U.S.S.R., assignors to Tsentralny Nauchno-Issledovatelsky Avtomobilny I Avtomotorny Institut (NAMI), Moscow, U.S.S.R.**

**Filed Dec. 16, 1976, Ser. No. 751,200**
**Int. Cl.[2] F16D *25/06***
**U.S. Cl. 192—85 AA** **4 Claims**




1. A hydraulically operated friction clutch rotatable about an axis comprising: a casing; friction elements accommodated within said casing; a spring-urged piston adapted to effect engagement of said friction elements, likewise accommodated within said housing; two variable volume chambers defined between said casing and said piston, arranged coaxially and permanently communicating with each other; said two variable volume chambers being adapted to receive therein liquid under pressure, controlling the engagement of said friction elements; pressure liquid supply passage means made in said casing for supplying pressure liquid; a drain passage made in said casing; a first one of said two variable volume chambers permanently communicating with said pressure liquid supply passage means; common passage means for connecting the second one of said two variable volume chambers with said pressure liquid supply passage means and with said drain passage; a valve means for selectively connecting said second variable volume chamber with said pressure liquid supply means and said drain passage, said valve means selectively connecting said common passage means with one of said pressure liquid supply means and said drain passage; said valve means having a movable valve member mounted for reciprocation in a direction substantially perpendicular to the axis of rotation of said friction clutch.

---

**4,147,246**

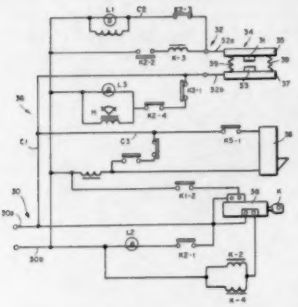
## ANTI-THEFT PARKING SYSTEM

**Robert L. Stevens, P.O. Box 2082, Framingham, Mass. 01701**

**Filed Oct. 25, 1977, Ser. No. 844,887**
**Int. Cl.[2] G07F *15/10***
**U.S. Cl. 194—9 T** **9 Claims**

1. In a designated parking area, an alarm system including an alarm circuit comprising a vehicle actuatable switch in said area actuatable by a vehicle parked in the area, a coin-operated switch and a key-operated switch, means operable by the activated vehicle switch to condition the coin-operated switch for operation, means operable by the deposit of a coin in the coin switch to release the key from the key-operated switch, alarm means, means operable by removal of the key from the

key-operable switch to condition the alarm means for operation, and means operable by deactivation of the vehicle actu-



ated switch in the absence of the key in the key switch to effect actuation of the alarm.

---

**4,147,247**

## APPARATUS FOR FEEDING ROD-LIKE ARTICLES

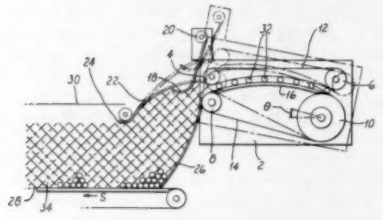
**Peter A. Clarke, London, Great Britain, assignor to Molins Limited, England**

**Filed May 9, 1977, Ser. No. 794,704**

**Claims priority, application United Kingdom, May 13, 1976, 19660/76**

**Int. Cl.[2] B65G *43/08***

**U.S. Cl. 198—347** **18 Claims**



1. Apparatus for feeding rod-like articles, comprising first conveyor means for feeding a first stream of rod-like articles in a direction transverse to their lengths; a transfer region towards which said first stream is fed by said first conveyor means; second conveyor means for moving articles away from the transfer region as a second stream of articles moving transverse to their lengths; a sensor for monitoring the rod-like articles in the transfer region; and means responsive to signals derived from the sensor for varying the speed of the second conveyor means; means supporting the first conveyor means so that it is displaceable relative to the second conveyor means to vary the capacity of the transfer region; and means for varying the speed of the second conveyor means in accordance with the displacement of the first conveyor means relative to the second conveyor means.

---

**4,147,248**

## DIVIDING CONTAINER CONVEYOR

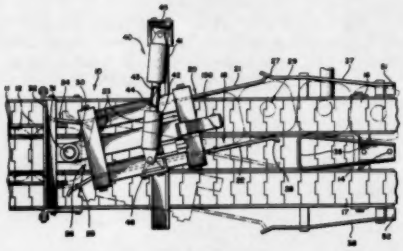
**Walter Kurczak, Chicago, and Richard Anthony, Lombard, both of Ill., assignors to Mojonnier Bros. Co., Chicago, Ill.**

**Filed Oct. 21, 1977, Ser. No. 844,219**

**Int. Cl.[2] B65G *47/26***

**U.S. Cl. 198—358** **9 Claims**

1. A divider mechanism for directing articles traveling along a stem conveyor to either one of a first or a second branch conveyors intersecting the stem conveyor at an intersection point, the divider mechanism comprising, in combination, diverter means disposed over the conveyor intersection point and adapted to divert the articles from the stem conveyor to a branch conveyor, diverter positioner means for locating the diverter means in a first position to divert articles from the stem conveyor to the first branch conveyor, and for alternatively locating the diverter means in a second position to divert articles from the stem conveyor to the second branch conveyor, first branch sensor means located near the first branch conveyor and downstream of the conveyor intersection point for sensing the presence or absence of articles on the first branch conveyor, second branch sensor means located near the second branch conveyor and downstream of the conveyor



intersection point for sensing the presence or absence of articles on the second branch conveyor, and switch means connected between each branch sensor means and the diverter positioner means, the switch means including logic means to direct articles from the stem conveyor to a branch conveyor at which the associated branch sensor means has sensed the absence or articles on the branch conveyor, bumper stop means located between the first and second conveyors, said switch means including additional logic means connected to said diverter positioner means so as to locate said diverter means at a third position and direct articles traveling along the stem conveyor against the bumper stop means when the first and second branch sensor means together sense the presence of articles on both the first and second conveyor.

---

**4,147,249**

## MACHINE FOR HANDLING CONTAINERS CONTINUOUSLY PASSING ON A MOVING BAND AND, MORE PARTICULARLY, GLASS BOTTLES

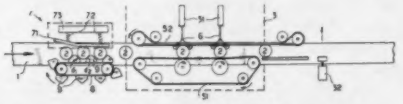
**Francois G. Tourres, Octeville-sur-Mer, France, assignor to International Glass Equipment Co., Le Havre, France**

**Filed Apr. 25, 1977, Ser. No. 790,612**

**Claims priority, application France, May 4, 1976, 76 13317**

**Int. Cl.[2] B65G *47/26***

**U.S. Cl. 198—459** **18 Claims**



1. In a production line for containers, said production line comprising a production unit, at least one control station and a moving conveyor moving said containers in a predetermined direction between the production unit and the control station, an apparatus cooperating with a predetermined length portion of the moving conveyor, for regularizing the spacing of the containers on the said length portion, said apparatus comprising:

at least two continuous members vertically spaced apart and adapted to move parallel to said conveyor surface in said

predetermined direction along at least a portion of their lengths and disposed on one side of said conveyor surface;

a plurality of projecting members, affixed to said continuous members and overlying said conveyor, said projecting members having a symmetrical configuration about a plane perpendicular to said predetermined direction, and being regularly distributed on said continuous member at distances in accordance with the dimension of said containers so as to provide the sole points of contact between the continuous members and the containers;

a pressure plate disposed on the other side of said conveyor surface to force said containers into engagement with said projecting members; and

drive means for moving said projecting members in said predetermined direction at a predetermined rate causing said projecting members to engage said containers at points on both sides of each projecting member in two spaced-apart planes parallel to said conveyor surface also moving in said predetermined direction, whereby the stability of said containers is maintained while the rate of said containers' motion in said predetermined direction is varied as required to separate the containers by predetermined distances.

---

**4,147,250**

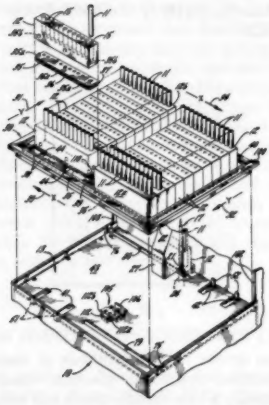
## STORAGE AND INDEXING MECHANISM FOR MULTIPLE SAMPLE CONTAINERS

**Isidore Schulz, Clarendon Hills, Ill., assignor to Packard Instrument Company, Inc., Downers Grove, Ill.**

**Filed Mar. 25, 1977, Ser. No. 781,203**

**Int. Cl.[2] B65G *37/00***

**U.S. Cl. 198—472** **4 Claims**



1. A storage and indexing mechanism for a plurality of sample containers, said mechanism comprising the combination of

(a) a portable tray for supporting and guiding a plurality of said sample containers along preselected indexing paths on the tray,

(b) a stationary stage for receiving and holding said tray and including

(1) means for indexing said sample containers along said indexing paths on said tray when the tray is mounted on said stage, and

(2) means for automatically registering said tray and the sample containers thereon with said indexing means when said tray is mounted on said stage, and means for locking said sample containers against sliding movement on said tray when the tray is removed from said stage.

**4,147,251**

## DEVICE FOR CONVEYING AND STORING CIGARETTES AND THE LIKE

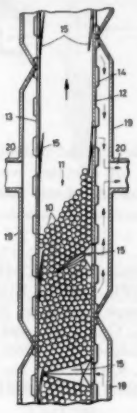
**Heinz Focke, Verden, Fed. Rep. of Germany, assignor to Focke & Pfuhl, Verden, Fed. Rep. of Germany**

**Filed May 3, 1977, Ser. No. 793,345**

**Claims priority, application Fed. Rep. of Germany, May 22, 1976, 2623069**

**Int. Cl.[2] B65G *15/44***

**U.S. Cl. 198—688** **24 Claims**



1. In an apparatus for selectively conveying or temporarily storing a plurality of rod-like articles such as cigarettes axially aligned parallel to each other and transverse to the direction of conveyance, and including two spaced, generally parallel planar elements defining opposite walls of a cigarette stream conveying or storing section between them, at least one of said elements comprising a movable belt having a plurality of spaced cigarette engaging members mounted thereon on the side facing the conveying or storing section, the improvement characterized by:

each of said engaging members comprising a selectively raisable element extendable to project into the cigarette stream in a transverse direction to implement conveying, and retractable out of the cigarette stream to implement temporary storing even during the movement of said belt, each selectively raisable element being made of a foldable material and extendable to a projecting conveying position by inflation with air.

---

**4,147,252**

## CONVEYOR WITH PUSHER FINGERS

**Gisbert Burkhardt, Reichenau, Fed. Rep. of Germany, assignor to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt, Fed. Rep. of Germany**

**Filed May 26, 1977, Ser. No. 800,919**

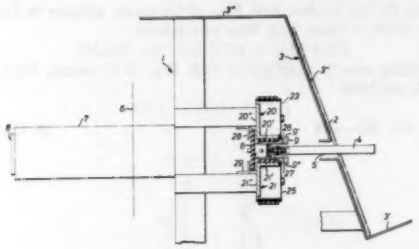
**Claims priority, application Fed. Rep. of Germany, May 29, 1976, 2624216**

**Int. Cl.[2] B65G *19/22***

**U.S. Cl. 198—732** **5 Claims**

1. A conveyor for substantially flat articles comprising a trough defining a conveying path for the articles; carriers having first and second members; pusher fingers individually mounted in and extending from said carriers and capable of being in contact with the articles; a pulling means to which said carriers are firmly connected at spaced intervals for moving said carriers along the conveying path; a first guide rail having a slide surface disposed in guiding relation to one member of said carriers; a second guide rail having a slide surface disposed in guiding relation to a second member of said carriers, said slide surfaces being mutually parallel and facing each other; and two endless belts each associated with said slide surface of

a respective one of said guide rails to coact with a respective one of said members, said belts being guided by rollers located



at each end of said guide rails and moving in the same direction as said pulling means for effecting wear-resistant and quiet guidance of said carriers and of said pulling means.

---

**4,147,253**

## SUPPLY PACKAGE FOR WET-IMPREGNATED MULTIFILAMENT ROVING

**Richard L. Brook; Joseph E. Gaske, both of Mt. Prospect; Thomas E. Kearney, Oak Park, and Russell D. Wydeen, Palatine, all of Ill., assignors to DeSoto, Inc., Des Plaines, Ill.**

**Filed Jun. 9, 1977, Ser. No. 805,176**
**Int. Cl.**[2] **B65D** *81/24;* **B65H** *54/00*
**U.S. Cl. 206—205** **7 Claims**

1. A supply package for wet-impregnated multifilament roving comprising multifilament roving impregnated with a curable organic liquid having a tack less than about 6 on a Thwing-Albert inkometer, said roving containing said curable liquid in an amount at least sufficient to fill the spaces between the filaments in the roving, but not in excess of about a 3:2 ratio of curable liquid to fiber, by volume, said impregnated roving being way wound onto a cylinder to provide a crossing angle between the rovings in adjacent layers of at least about 10° to provide free volume storage capacity between the angled rovings to accept any of said liquid which may run off a roving, whereby said wet-impregnated roving can be easily withdrawn from the cylinder and said way wound cylinder being packaged within a liquid-impermeable wrapper.

---

**4,147,254**

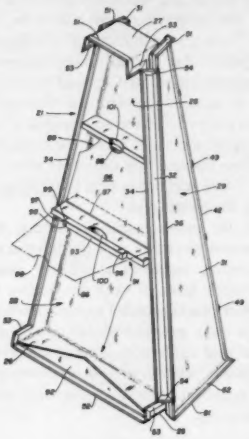
## FREE-STANDING CARRYING CASE FOR MUSICAL INSTRUMENT

**Jeffrey S. Bruce, Oakland, Calif., assignor to Stagehand Associates, Oakland, Calif.**

**Filed Jul. 14, 1977, Ser. No. 815,526**
**Int. Cl.**[2] **A45C** *11/00;* **B65D** *85/54*
**U.S. Cl. 206—314** **9 Claims**

1. A carrying case for a musical instrument or the like including a case body having a base, front, back and connecting sides defining an internal cavity dimensioned for receipt of said instrument, said body having movable portion means formed for movement to and from an open position and a closed position to enable positioning of said instrument in and removal of said instrument from said cavity, wherein the improvement in said carrying case is comprised of:

hinge means mounting said movable portion means to said body to move said portion means to a position extending rearwardly of said back of said body when said movable portion means is in said open position and to elevate a lower edge of said portion means remote of said body at a spaced distance above a generally horizontal support surface to cooperatively support said carrying case in a stable, upright, free-standing position on said horizontal support surface by tilting said carrying case back until said lower edge of said movable portion means remote from said body engages said horizontal support surface and



cooperatively supports said carrying case with a rear edge of said base.

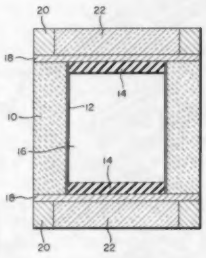
---

**4,147,255**

## PROCESS FOR SYNTHESIZING DIAMONDS

**Hiroshi Ishizuka, 19-2 Ebara 6-chome, Shinagawa-ku, Tokyo, Japan**

**Filed Oct. 27, 1977, Ser. No. 845,960**
**Claims priority, application Japan, Oct. 27, 1976, 51/129042**
**Int. Cl.**[2] **C01B** *31/06;* **B65D** *85/00*
**U.S. Cl. 206—525** **3 Claims**




1. A reaction device for the synthesis of diamonds which comprises a hollow, cylindrical reaction vessel made of a refractory material, a thin tubular electrical heating element contiguously fitted within the reaction vessel so as to define a reaction chamber therein, a pair of disk plates made of a thermal and electrical insulation material and each having a diameter substantially the same as the inner diameter of said heating element so as to be fitted therein to close both open ends of the heating element and to define the reaction chamber in its longitudinal direction, said reaction chamber being adapted to contain at least two layers of reaction materials which consist essentially of material carbon and a solvent-catalyst metal, at least one disk plate made of a thermal and electrical insulation material, said disk plate being disposed between adjacent layers of the reaction materials, a pair of electrically conductive disks each arranged to contact the free end of said heating element for supplying electrical current thereto for heating the same, a pair of electrically conductive rings, each being arranged to contact one of said electrically conductive disks for supplying electrical current to said heating element through said conduc-

tive disks, and a pair of heat insulation disks each being fittedly accommodated in each of said electrically conductive rings to prevent heat generated in the reaction chamber from leaking.

---

**4,147,256**

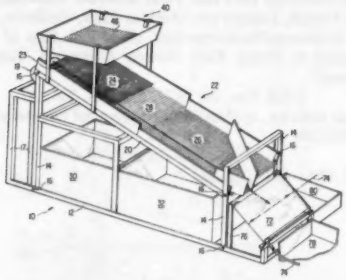
## WORM HARVESTING APPARATUS AND METHOD

**Howard M. Kiss, 2526 Wilmette Ave., Titusville, Fla. 32780**

**Filed Jan. 9, 1978, Ser. No. 867,677**

**Int. Cl.[2] B07C** *5/04, 9/00*

**U.S. Cl. 209—632** **15 Claims**



1. An apparatus for separating worms from their bedding material which generally includes earth, peat moss, worm eggs and castings, said apparatus comprising in combination:

a frame;

screen means operably coupled to said frame for selectively filtering worms from their bedding material, said screen means including a perforated screen having a feed section and a downstream section with a longitudinal axis defined therebetween, with said longitudinal axis generally sloped with regard to the horizontal for progressively and selectively filtering the worms and their bedding material from said feed section to said downstream section;

vibratile means coupled to said frame and said screen means for imparting relative motion therebetween; and

conveyor means adjacent said screen means for receiving the selectively filtered worms and bedding material therefrom, said conveyor means including a conveyor having a width inclined with regard to the horizontal and having an axis of motion generally transverse to said width and to said longitudinal axis, whereby the worms will cling to said conveyor and will be transported along said axis of motion while the bedding material will continue to roll down said width of said conveyor.

---

**4,147,257**

## DEVICE FOR JOINING CONSOLIDATED LAMELLAR MATERIAL

**Herbert Zippel, Altdorf b. Nüremberg, Fed. Rep. of Germany, assignor to Herbert Zippel GmbH & Co., Nüremberg, Fed. Rep. of Germany**

**Filed Jul. 21, 1977, Ser. No. 817,824**

**Claims priority, application Fed. Rep. of Germany, Sep. 8, 1976, 2640438**

**Int. Cl.[2] A47F** *5/08;* **B42F** *1/00*

**U.S. Cl. 211—45** **27 Claims**

1. A device for retaining consolidated lamellar material comprising:

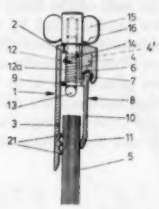
a sectional rail having a generally J-shaped cross-section and including long and short leg portions;

a clamp rail having first and second leg portions joined to form a generally L-shaped cross-section and an apex portion corresponding to the juncture of said leg portions;

a channel extending along said short leg and having a predetermined cross-sectional shape, the cross-section of said channel being wider at the interior of said leg than at the surface thereof;

a ridge-like projection extending along said clamp rail in the vicinity of the apex portion thereof, said projection being a continuation of said first leg and having a cross-sectional shape conforming substantially to the cross-section of said short leg channel and being journaled therein;

actuating means acting on said second leg and said sectional rail for selectively pivoting said clamp rail with respect to said sectional rail; and



resilient means disposed between said sectional rail and said clamp rail to provide a force therebetween tending to separate said long leg and said first leg;

said lamellar material being retained in said device by being placed between said long leg and said first leg, said actuating means being operated to pivot said clamp rail so that said first leg rotates about a fixed point, said long leg and said first leg clamping said lamellar material therebetween.

---

**4,147,258**

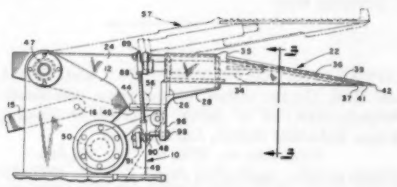
## TRANSFER FOR ELONGATED ARTICLES HAVING OPTIONAL ROLLING RESTRAINT

**Irving L. Kaplan, Pepper Pike, Ohio, assignor to Carl Krasny & Associates, Inc., Cleveland, Ohio**

**Filed Mar. 30, 1977, Ser. No. 782,622**

**Int. Cl.[2] B65G** *47/90*

**U.S. Cl. 414—680** **23 Claims**



11. A transfer apparatus for a plurality of elongated articles comprising a transfer platform, means for elevating said transfer platform to pick up such articles and for moving them to a different location, a rolling restraint for such articles mounted on said transfer platform, and means operative to elevate said restraint above said platform from below said platform to engage such articles as said platform is elevated.

---

**4,147,259**

## FEED MECHANISM FOR LOG SAWING MACHINE

**Uno B. Nilsson, Bruzaholm, Sweden, assignor to Bruzaholms Maskiner AB, Hjaltevad, Sweden**

**Filed Dec. 1, 1977, Ser. No. 856,129**

**Int. Cl.[2] B65G** *47/90*

**U.S. Cl. 414—745** **6 Claims**

1. Feed mechanism by which elongated workpieces such as logs can be fed in rapid succession through a cutting zone of a sawing machine or the like with a translatory substantially lengthwise motion in a horizontal feed direction, said feed mechanism comprising:

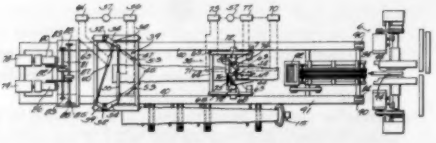
A. means defining parallel inner and outer tracks extending in said feed direction and located at a level above said

cutting zone, each of said tracks comprising a pair of laterally spaced rail members, and both rail members of the inner track being located between the rail members of the outer track;

B. an inner carriage riding on said inner track and guided thereby for motion in said feed direction and in an opposite return direction, all portions of said inner carriage being located substantially between laterally outer limits defined by the rails of the inner track;

C. a pair of jaw arms carried by said inner carriage, each projecting obliquely downwardly and substantially in the feed direction from a normally upright swinging axis, the swinging axes of said jaw arms being spaced apart laterally but located between the rails of the inner track;

D. means on said inner carriage for swinging said jaw arms convergingly and divergingly about their swinging axes;



E. an outer carriage bridging over the inner track and riding on the outer track to be constrained thereby to motion in the feed and return directions, the portion of said outer carriage that is over the inner track being spaced a substantial distance above the same to be clear of all portions of the inner carriage;

F. a second pair of jaw arms carried by said outer carriage, each projecting obliquely downwardly and substantially in the feed direction from a substantially upright swinging axis, the swinging axes of said second jaw arms being laterally outwardly of the outer track at opposite sides thereof; and

G. means on said outer carriage for swinging said second pair of jaw arms convergingly and divergingly about their swinging axes.

---

**4,147,260**

## APPARATUS COLLECTING PIPES AND THE LIKE

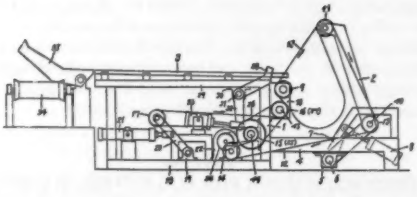
**Kunio Kaji, Osaka; Hideo Azuma, Otsu, and Kunio Iwade, Hagashiosaka, all of Japan, assignors to Hankyu Zouki Kogyo Kabushiki Kaisha, Osaka, Japan**

**Filed Jan. 10, 1978, Ser. No. 868,410**

**Claims priority, application Japan, Oct. 25, 1977, 52-128285**

**Int. Cl.[2] B30B *5/04***

**U.S. Cl. 414—98** **5 Claims**



1. An apparatus for collecting pipes and similar articles comprising at least one pair of front props erected at a certain distance from each other; at least one pair of rear props located to the rear of the front props, each rear prop being higher than said front props; at least one pair of feed means, each feed means being rotatably fixed upon the top of one of said front props; at least one pair of take-up means, each take-up means being rotatably fixed upon the top of one of said rear props; at least one pair of swing means movable forward and backward; at least one pair of flexible pipe receiving means mounted on said feed means, said take-up means, and on said swing means; and driving means for driving said pipe receiving means from said feed means to said take-up means, the peripheral velocity of said take-up means being

lower than that of said feed means, and said number of pairs of front props, rear props, take-up means, feed means, swing means, pipe receiving means, and driving means all being equal.

---

**4,147,261**

## LOADING DEVICE FOR GOODS VEHICLES

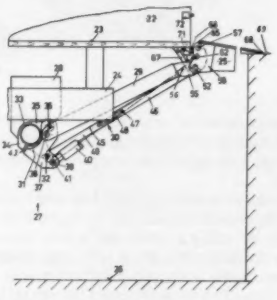
**Helmut Dautel, Leingarten; Mathias Fritz, Oedheim, and Gerd Bar, Heilbronn-Neckargartach, all of Fed. Rep. of Germany, assignors to Firma Emil Dautel, Kipperbau, Fed. Rep. of Germany**

**Filed Nov. 30, 1977, Ser. No. 856,187**

**Claims priority, application Fed. Rep. of Germany, Nov. 30, 1976, 2654286**

**Int. Cl.[2] B60P *1/44***

**U.S. Cl. 414—557** **29 Claims**



1. A loading device for a goods vehicle having a superstructure with a loading surface, comprising support means fixed to the vehicle between road level and said loading surface, a lifting platform for receiving goods to be loaded, two lifting arms and two associated guiding arms hinged at their inner ends to said support means and hinged at their outer ends to said lifting platform with said guiding arms below said lifting arms and with each lifting arm and associated guiding arm together with said support means and said lifting platform forming a parallelogram linkage, a pressure fluid operated cylinder-piston ram associated with each said parallelogram linkage, each of said rams being hinged at its inner end to said support means below the hinge axes of said lifting and guiding arms, the outer end of a first one of said rams being hinged to a first one of said lifting arms in the region of its outer end and a second one of said rams being hinged to said lifting platform at a distance from and below the hinge, connection of a second of said lifting arms to said lifting platform, means for supplying pressure fluid to said rams to actuate the same, both of said rams being operable in cooperation with said lifting arms to raise said lifting platform from a lower position to loading surface height and said second ram in cooperation with said second lifting arm being also operable to swing said lifting platform upwardly in a closing pivoting motion from horizontal position toward vertical position to act as a tailgate, said pressure fluid supply means comprising fluid connections between said rams to equalize the pressure therein, a fluid reservoir and a common return line from said rams to said reservoir, said return line having a restriction therein, whereby fluid pressure produced in said second ram by movement of said lifting platform from vertical position toward horizontal position by its own weight is transmitted through said fluid connections to said first ram to retain said lifting platform at loading surface height until it has returned to horizontal position.

**4,147,262**

## EXCAVATING AND LOADING MACHINE MOUNTED ON A WHEELED TYPE VEHICLE

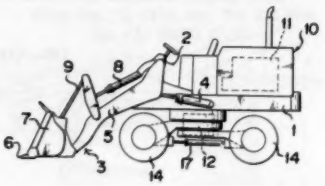
**Haruhiko Umeda, Yokohama; Masaru Uenoyama, Kawasaki; Kotoshige Ishizuki, Yokohama, and Hideo Hara, Kawasaki, all of Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan**

**Filed Jun. 24, 1977, Ser. No. 809,700**

**Claims priority, application Japan, Jun. 29, 1976, 51-76033; Jun. 29, 1976, 51-76034**

**Int. Cl.[2] E02F *3/72***

**U.S. Cl. 414—687** **4 Claims**




1. An excavating and loading machine mounted on a wheeled type vehicle comprising:

a rear frame having wheels rotatably mounted thereon at both ends thereof, said rear frame having an axial cylinder formed thereon;

first bearing means mounted on a lower part of the outer periphery of said axial cylinder;

second bearing means mounted on an upper part of the outer periphery of said axial cylinder;

a front frame having wheels rotatably mounted thereon at both ends thereof, said front frame being rotatably mounted on said axial cylinder of said rear frame about said first bearing means;

a vehicle body having an implement for effecting excavation and loading operations, said vehicle body being rotatably mounted on said axial cylinder of said rear frame about said second bearing means;

first rotating means for rotating said front frame relative to said rear frame about said axial cylinder; and

second rotating means for rotating said vehicle body about said axial cylinder wherein said second means comprises a ring gear fixedly secured to the inner surface of said axial cylinder, and a motor having a pinion attached thereto and fixedly secured to said vehicle body, said ring gear being adapted to mesh with said pinion.

---

**4,147,263**

## HIGH LIFT LOADER WITH EXTENDED TRANSFER

**Sherman B. Frederick, New Hope, and Ernst A. Dahlquist, Burnsville, both of Minn., assignors to Lull Engineering Company, Inc., St. Paul, Minn.**

**Filed Jan. 6, 1977, Ser. No. 757,397**

**Int. Cl.[2] B66F *9/00***

**U.S. Cl. 414—718** **14 Claims**

1. A mobile extended reach high-lift loader comprising:

(A) a vehicle having a longitudinally extending frame,

(B) a first pair of parallel spaced apart horizontal longitudinal track rails supported by the rearward portion of said frame,

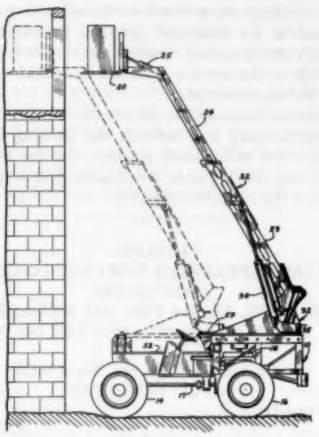
(C) a second pair of parallel spaced apart horizontal longitudinal track rails supported by said frame forwardly of and lower than said first pair of tracks,

(D) a transfer carriage mounted for longitudinal reciprocal movement on said track rails,

(E) means for reciprocating said transfer carriage,

(F) boom means pivotally secured at one end to said transfer carriage,

(G) means for elevating said boom means, and



(H) load handling means pivotally secured to the free end of said boom.

---

**4,147,264**

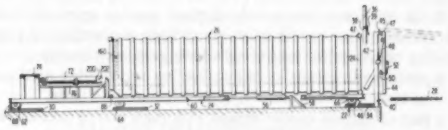
## APPARATUS FOR LATCHING AND UNLATCHING REFUSE CONTAINERS

**Samuel E. Harvey, Knoxville; James S. Whitehead, Maryville, and Paul L. Goranson, Knoxville, all of Tenn., assignors to Carrier Corporation, Syracuse, N.Y.**

**Division of Ser. No. 641,524, Dec. 17, 1975, Pat. No. 4,094,424. This application May 19, 1977, Ser. No. 798,734**

**Int. Cl.[2] B65G *65/04***

**U.S. Cl. 414—411** **3 Claims**



1. Apparatus for use with a removable refuse container having a tailgate and a tailgate latching mechanism, the latching mechanism including an actuating member wherein movement of the actuating member in a first direction latches the tailgate to the container and movement of the actuating member in a second direction unlatches the tailgate from the container, comprising:

a container support for removably supporting the refuse container;

a securing member carried by the container support for movement between a container receiving position, wherein the container is removable from the container support, and a container securing position, wherein the container is secured to the container support;

securing power means to move the securing member between the container receiving position and the container securing position;

a latching arm pivotally mounted to the container support for movement between a latching arm spaced position, wherein the latching arm is spaced from the actuating member, and a latched position, wherein, as the latching arm moves from the latching arm spaced position to the latched position, the latching arm engages the actuating member and moves the actuating member in the first direction to latch the tailgate to the container;

an unlatching arm pivotally mounted to the container support for movement between an unlatching arm spaced position, wherein the unlatching arm is spaced from the actuating member, and an unlatched position wherein, as the unlatching arm moves from the unlatching arm spaced position to the unlatched position, the unlatching arm engages the actuating member and moves the actuating member in the second direction to unlatch the tailgate from the container; and

power means connected to the container support for pivoting the latching arm between the latching arm spaced position and the latched position, and for pivoting the unlatching arm between the unlatching arm spaced position and the unlatched position.

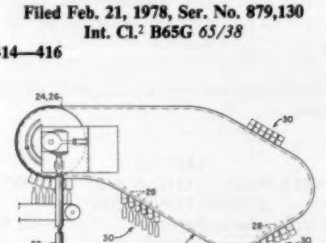
---

**4,147,265**

## ADJUSTABLE APPARATUS FOR CASE LOADING AND UNLOADING

**Robert W. McGill, Munroe Falls, and Michael E. Winiasz, Lorain, both of Ohio, assignors to A-T-O, Inc., Willoughby, Ohio**

**Filed Feb. 21, 1978, Ser. No. 879,130**
**Int. Cl.[2] B65G *65/38***
**U.S. Cl. 414—416** **16 Claims**



1. In apparatus for article deposit and/or removal from carrier case, the combination comprising a plurality of positioning members for mounting article grippers thereon,

a pantograph means including leading and trailing ends and at least one fulcrum pivot intermediate said ends,

a pair of endless carrier means with each one of said carrier means engaging a different end of said pantograph means, said carrier means being movable through a fixed course,

drive means operatively engaging said pair of endless carrier means to move them through fixed courses, and

adjustable means connecting said pair of carrier means to said drive means to provide adjustment of the individual ones of said carrier means in relation to each other to vary the size of said pantograph means, individual ones of said positioning members being secured to the ends and fulcrum pivot of said pantograph means to be moved therewith.

---

**4,147,266**

## SEMI-TRAILER FOR HANDLING AND TRANSPORTING STANDARDIZED CONTAINERS

**Antoine Corompt, Saint-Etienne, France, assignor to Bennes Marrel, Andrezieux Boutheon, France**

**Filed Mar. 18, 1977, Ser. No. 779,287**
**Claims priority, application France, Mar. 19, 1976, 76 08616**
**Int. Cl.[2] B60P *1/04***
**U.S. Cl. 414—480** **10 Claims**

1. A semi-trailer vehicle comprising:

a main chassis;

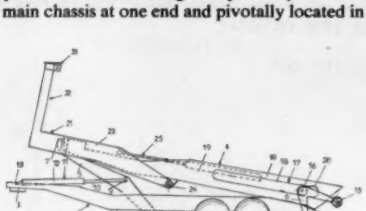
a false chassis mounted to said main chassis and having a longitudinal guide therein, said longitudinal guide having an upward directed extension at the rear end thereof;

means for connecting said main chassis to said false chassis, said connecting means comprising:

a front pair of large connecting rods pivotally connected to said main chassis and to said false chassis;

at least one double-acting ram pivoted by transverse pivots to the central part of the main chassis at one end and to the large connecting rods at the other end; and

a rear pair of small connecting rods pivotally connected to the main chassis at one end and pivotally located in said



longitudinal guide of said false chassis at a point other than said one end, whereby when said front pair of rods are at the end of their forwards pivotal movement, said rear pair of small connecting rods are located in the upward directed extension of said longitudinal guide, and rearward pivotal movement of said front pair of rods acts to tilt and slide said false chassis rearward by movement of said longitudinal guide passed said rear pair of rear connecting rods at the other end of said rear pair of connecting rods.

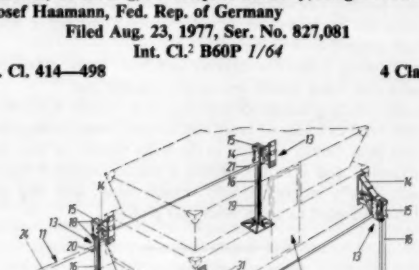
---

**4,147,267**

## EQUIPMENT FOR LIFTING AND DEPOSITING CABINS, SHELTERS, REPLACEMENT CONSTRUCTIONS AND THE LIKE

**Erich Mai, Collenberg, Fed. Rep. of Germany, assignor to Firma Josef Haamann, Fed. Rep. of Germany**

**Filed Aug. 23, 1977, Ser. No. 827,081**
**Int. Cl.[2] B60P *1/64***
**U.S. Cl. 414—498** **4 Claims**



1. In lifting and depositing equipment for a shelter or the like having sidewalls and being movable on the loading surface of a truck or similar vehicle with upright sidewalls having upper rims, said equipment comprising a plurality of jacks and trusses for detachably fastening said jacks to the sidewalls of the shelter, the improvement comprising:

a detachable, laterally displaceable roller system (22) and a guidance system (23) mounted on the trusses (14) of at least two jacks (13) that are mutually oppositely disposed with respect to the transverse direction, the roller system being positioned to engage the upper rims (24) of the upright sidewalls (25) of the truck and support the shelter

when the truck is moved beneath the shelter so as to provide a space between the shelter and the loading surface (12) and the sidewalls (25), and the guidance system (23) being positioned to engage the sidewalls (25) to laterally align the shelter (10) with respect to said sidewalls (25) and loading surface (12) in order to permit a central deposition of shelter (10) on the loading surface (12) of truck (11).

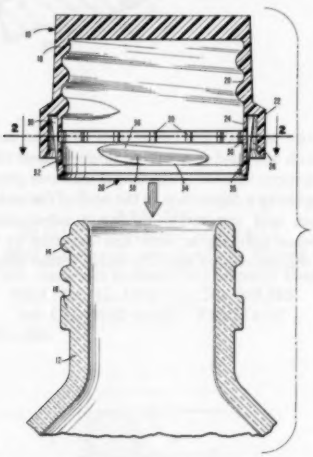
---

4,147,268

## PILFER-PROOF CLOSURE FOR CONTAINERS

Chandrakant S. Patel, and Rashmikant S. Patel, both of 17 D, Nandanvan Society, Baroda-5, Gujrat, India

Filed Sep. 24, 1976, Ser. No. 726,114
Int. Cl.[2] B65D *41/34*
U.S. Cl. 215—252 8 Claims



1. A pilfer-proof closure for use in combination with a standard container having a threaded neck portion and a collar below said threaded portion comprising:

a body having an internally threaded portion and a lower skirt portion;

a flexible locking member spaced inwardly from said skirt portion, said locking member adapted to slide over the collar as the closure is threaded onto the container;

said locking member having a top surface adapted to engage the bottom surface of the collar to lock the closure in place when the closure is completely threaded onto the container;

frangible connecting means for releasably securing said locking member to the inside of said body, whereby said frangible connecting means will be severed by the collar acting on said top surface when the closure is unthreaded from the container to disconnect said locking member from said body; and

said top surface extending across said locking member in a downward direction equal to the direction of the threads on said internally threaded portion so that the closure may be unscrewed from its forming apparatus without severing said frangible connecting means.

---

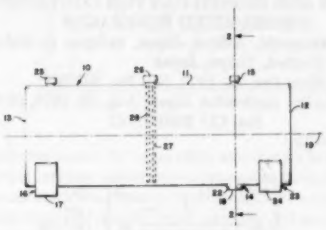
4,147,269

## FUEL OIL STORAGE TANK

David A. Werts, 8722 Lakefront Dr., Richmond, Va. 23229

Filed Nov. 14, 1977, Ser. No. 851,023
Int. Cl.[2] B01D *21/10;* B65D *87/06*
U.S. Cl. 220—1 B 6 Claims

1. A vessel of large size and integral molded construction comprising a cylindric wall having a longitudinal center axis, said vessel being horizontally disposed with respect to said center axis enclosing end walls disposed substantially perpendicularly to said axis at each extreme of said cylindric wall and adapted to define an enclosed space therewith, a depressed well positioned adjacent the forward extreme of the underside of said cylindric wall as a continuous integral appendage thereof communicating with the interior of said vessel and extending below said cylindric wall, an opening through the cylindric wall centered where a line passing through the center of said well and perpendicularly intersecting said longitudinal axis would intersect the opposing, upper portion of the cylindric wall, a first pedestal positioned at the underside of said vessel adjacent its rear extreme, said pedestal extending downwardly from the cylindric wall and terminating in a lowermost portion having the form of an elongated flat surface disposed in



perpendicular relationship to said longitudinal axis, a second pedestal positioned at the underside of said vessel adjacent its forward extreme and extending downwardly from the cylindric wall to a lowermost portion located closer to said wall than the corresponding lowermost portion of said first pedestal and further from said wall than the lowermost portion of said well, said well being located between said first and second pedestals at a location closer to said second pedestal, said location defining sludge accumulation means such that the vessel, when rested on a horizontal flat surface, will be tilted downwardly toward said well at an angle within the range of 3 to 10 degrees measured between said longitudinal axis and a horizontal line causing sedimentary material to drain toward said well and accumulate therein, and the lowermost portion of said well will not contact said horizontal flat surface.

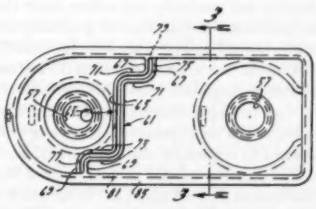
---

4,147,270

## MASTER CYLINDER RESERVOIR

Thomas A. Brandon, Jr., Lathrup Village, and Norman H. Beyer, Royal Oak, both of Mich., assignors to Chrysler Corporation, Highland Park, Mich.

Filed Mar. 18, 1977, Ser. No. 778,893
Int. Cl.[2] B65D *1/24;* F15B *7/10*
U.S. Cl. 220—22 2 Claims



1. A reservoir for the master cylinder of a vehicle hydraulic brake system, said reservoir comprising a lower fluid carrying portion, an upper cover portion secured to the upper rim of said lower fluid carrying portion, and divider means dividing said reservoir into two reservoir sections, said divider means including two transversely extending intermediate walls spaced from each other to form a space therebetween and

extending from one side wall of said reservoir to the other side wall of said reservoir, each of said intermediate walls having an opening therein, said openings being adjacent opposite side walls of said reservoir offset in a transverse direction from one another to inhibit the free flow of fluid from one section to another, wherein said intermediate walls extend from one side of one of said reservoir portions to the other side of the same reservoir portion and said divider means further including partition means extending from said other reservoir portion into engagement with said intermediate walls.

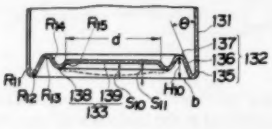
---

**4,147,271**

## DRAWN AND IRONED CAN BODY AND FILLED DRAWN AND IRONED CAN FOR CONTAINING PRESSURIZED BEVERAGES

**Hisakichi Yamaguchi, Ashiya, Japan, assignor to Daiwa Can Company, Limited, Tokyo, Japan**

**Filed Jun. 22, 1977, Ser. No. 808,738**
**Claims priority, application Japan, Aug. 20, 1976, 51-99296**
**Int. Cl.[2] B65D *7/42***
**U.S. Cl. 220—70** **7 Claims**



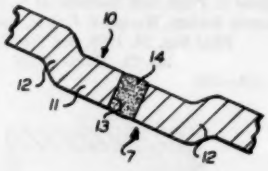

1. A lightweight can used for containing products such as beer, carbonated soft drinks and the like which contained products subsequent to sealing of the can are subjected to environmental conditions which are capable of causing generation of pressures up to a magnitude of a predetermined value within said can, said can including a can body having a bottom closure wall made integral with a straight side wall and a top closure wall at the opening end of said can body, said bottom closure wall comprising an outer peripheral portion including a first curved turning portion which is an extension of the lower end of the straight side wall and turns inwardly and upwardly and defines a standing base for said can body, an inclined wall which extends upwardly and nearly tangentially from the said first curved turning portion toward the can longitudinal axis and a second curved turning portion which is an extension of said inclined wall, and turns downwardly, and inwardly said bottom wall further having a central portion comprising a peripheral grooved portion which is an extension of the second turning portion and extends upwardly and forms a shallow groove, and a substantially flat central part surrounded by said peripheral grooved portion, said central portion being flexible and gradually distending under the influence of pressures generated in said can to gradually increase the internal volume thereof and correspondingly limit the pressure generated within the can to a value at least 0.3 kg/cm$^2$ less than said predetermined magnitude, the outer peripheral portion of said bottom wall having a buckling resistant strength at least sufficient to withstand the pressure of said lower reduced value but not sufficient to withstand said pressure of predetermined magnitude, the flexibility of said central portion being such as to limit the distension thereof under the influence of pressure in said can at normal temperature conditions to displacement of said central part axially downwardly past said shallow groove a distance in which said central part does not extend beyond the end plane of said can defined by said standing base, the thickness of said outer peripheral portion being at least 0.01 mm less than the corresponding portion would have in a can made of the same material and similar shape but is provided with a buckling resistant strength sufficient to withstand said pressure of predetermined magnitude.

**4,147,272**

## PRESSURE RELIEF DEVICE

**Irving H. Stenner, Brockport, and John M. Nelson, Rochester, both of N.Y., assignors to Bernzomatic Corporation, Medina, N.Y.**

**Filed May 6, 1977, Ser. No. 794,574**
**Int. Cl.[2] B65D *25/00*; F16K *17/14***
**U.S. Cl. 220—89 B** **7 Claims**




1. In a high pressure gas cylinder of the type usable for an oxy-fuel torch and having a valved dome-shaped end portion, wherein the improvement comprises at least one pressure relief means comprising a depression in the wall of the end portion of the cylinder, said depression having a substantially planar portion, means defining at least one aperture in the planar portion of the depression and a eutectic solder filling in each aperture.

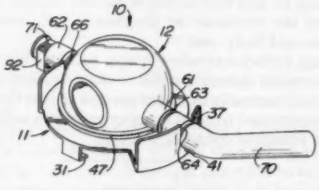
---

**4,147,273**

## RADIATOR VALVED CLOSURE

**Joseph J. Malacheski, and Richard J. Zenda, both of 32 Warner St., Plains, Pa. 18705**

**Filed May 1, 1978, Ser. No. 901,474**
**Int. Cl.[2] B65D *51/16***
**U.S. Cl. 220—204** **10 Claims**




1. In a heat exchanger, the combination comprising a liquid chamber having a top wall, a filling neck upstanding from and opening through said top wall, a flange on said neck, an annular adaptor for removable engagement over the upper end of the neck in interfitting relation with the flange, a pair of aligned upwardly opening pedestal bearings upstanding from

opposite locations on said adaptor, an annular insert on said adaptor, an annular upwardly facing seat on said insert, a valve element having an exterior sealing region of spherical curvature engageable in sealing relation with said seat, said valve element having a through passageway extending generally chordally to said exterior sealing region, a pair of aligned shafts extending from opposite sides of said valve element and journaled in respective bearings to guide said valve element for rotation to shift said through passageway into communication through said neck with said chamber, and resilient means yieldably retaining said shafts downwardly in said bearings against internal pressure in said chamber.

---

**4,147,274**

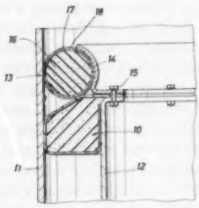
**FLOATING ROOF TANK SEAL**

**William E. Hall, Lakewood, and James G. Record, Anaheim, both of Calif., assignors to Shell Oil Company, Houston, Tex.**

**Filed May 12, 1978, Ser. No. 905,263**

**Int. Cl.[2] B65D *87/207*; F16J *15/32***

**U.S. Cl. 220—226** **9 Claims**



**1.** A rim seal for a floating roof tank to seal the space between the floating roof and circumferential wall of the tank, comprising, a compressible toroid of approximately the diameter of the tank and having a cross-sectional diameter greater than the largest opening between the floating roof and the circumferential wall or an existing seal and the circumferential wall, an inner tube which encapsulates the toroid, an outer tube which is elastic and encapsulates the inner tube, slits in the outer tube adjacent the circumferential wall and disposed substantially circumferentially with respect to the toroid, and means for attaching the rim seal to the floating roof.

---

**4,147,275**

**Patent Not Issued For This Number**

**4,147,276**

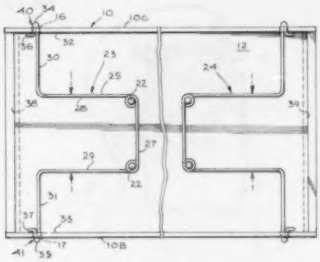
**RETAINER DEVICE MEANS FOR HINGING OR REMOVABLY ATTACHING A COVER TO A CHASSIS**

**William D. Jordan, Jr., Woodland Hills, Calif., assignor to Canoga Controls Corporation, Canoga Park, Calif.**

**Filed Sep. 29, 1977, Ser. No. 837,901**

**Int. Cl.[2] B65D *45/28***

**U.S. Cl. 220—323** **8 Claims**



**1.** Fastening means for removably attaching a housing cover to a chassis carrying electronic components, comprising:

a retainer device secured to said chassis and including a pair of substantially parallel arms spring-urged away from one another;

said housing cover having openings therein disposed opposite one another in substantial alignment;

said chassis and housing cover being oriented relative to one another such that portions of said arms project into said housing cover openings to thus fasten said cover to said chassis.

---

**4,147,277**

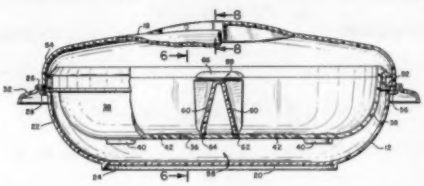
**SERVING DISH**

**Robert F. Bateman, Greenville, R.I., and Richard A. Boucher, Fitchburg, Mass., assignors to Dart Industries Inc., Los Angeles, Calif.**

**Filed Jun. 2, 1977, Ser. No. 802,754**

**Int. Cl.[2] B65D *25/00***

**U.S. Cl. 220—400** **1 Claim**

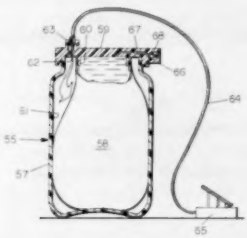


**1.** A serving dish and comprising a container having an integral bottom wall and side wall structure said side wall including an upper terminal edge and incorporating an upwardly directed ledge portion immediately adjacent said edge, a colander member having an integral bottom wall and side wall arrangement, said side wall arrangement terminating in a peripherally extending downwardly positioned lip, which lip mates with said upwardly directed ledge thereby supporting the bottom wall and side wall arrangement of the colander in juxtaposition with but spaced from the bottom wall and side wall structure of the container, with said side wall thereof protruding above said upper terminal edge said bottom wall of the colander also having a plurality of openings extending therethrough, a divider having a top wall and juxtaposed depending walls from the bottom edge of which a plurality of protuberances depend, said protuberances being positioned so as to mate with certain of the openings in the bottom wall of said colander thereby firmly supporting the divider therein.

## 4,147,278
## FLUID PRODUCT DISPENSER

Albert R. Uhlig, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Division of Ser. No. 588,751, Jun. 20, 1975. This application Apr. 7, 1977, Ser. No. 785,324
Int. Cl.[2] B65D *83/14, 35/28*
U.S. Cl. 222—94 4 Claims

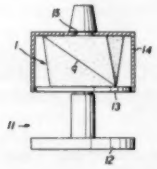


1. A fluid product dispenser comprising, in combination, a rigid first container, a second container positioned within said first container, said second container comprising a flexible bag for receiving a fluid product, a cap removably mounted on said first container, a product dispensing means defined by said cap and in communication with said second container for dispensing the fluid product located in said second container, said first container and said second container defining therebetween a pressure chamber, and means in communication with such chamber for introducing pressurized fluid into such chamber whereby a force may be transmitted to said second container urging the fluid product outwardly through said product dispensing means, said product dispensing means including a check valve means for preventing reverse flow.

## 4,147,279
## FOLDINGLY COLLAPSIBLE CONTAINER AND HOLDER-STAND THEREFOR

Ichinosuke Matsui, No. 3-226-2, Nisshin, Oomiya-shi, Saitama-ken, Japan

Filed Feb. 21, 1978, Ser. No. 879,385
Claims priority, application Japan, Nov. 2, 1977, 52/131874
Int. Cl.[2] B65D *83/00*
U.S. Cl. 222—95 6 Claims

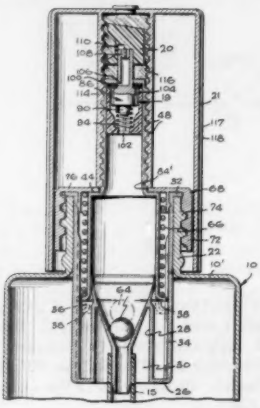


1. A collapsible container comprising:
a bottom wall of an equilateral polygonal shape;
a top wall of the same shape as said bottom wall and centrally provided with a dispensing mouth; and
quadrilateral side walls provided in a number corresponding to the number of sides of said polygonal bottom wall;
said side walls being laterally endlessly connected with each other and joined with the opposing sides of said bottom and top walls and said side walls being demarcated from each other and from said bottom and top walls by outwardly creased ridges and each having a diagonal inward crease running from one top corner to a non-adjacent bottom corner thereof wherein said container is set on a holder-stand comprising a round rotatable top plate and a bottomless cylindrical cover having an opening at the center of the top wall thereof for receiving said dispensing mouth of said container, said cover being fitted over the body of said container and loosely around the circumference of said top plate.

## 4,147,280
## PUMP DEVICE FOR DISPENSING FLUIDS

Walter B. Spatz, Pacific Palisades, Calif., assignor to Spatz Corporation, Santa Monica, Calif.

Continuation of Ser. No. 597,829, Jul. 21, 1975, abandoned. This application Dec. 20, 1976, Ser. No. 752,105
Int. Cl.[2] B05B *11/00*
U.S. Cl. 222—179.5 14 Claims



1. A fluid dispensing device, comprising a container for the fluid adapted to be held in a person's hand, pump means mounted in said container including a housing fixed to said container and a cylinder in said housing shiftable with respect to said housing and container, said cylinder having a pump chamber therein and an external thread, means providing a slidable spline connection between the lower end of said cylinder and said housing to prevent rotation of said cylinder in said housing, said pump means including a member fixed in said container and disposed in said chamber in slidable sealed relation to said cylinder, spring means in said housing surrounding said cylinder and bearing against said lower end of said cylinder to shift said cylinder and its chamber in one direction with respect to said member to cause said cylinder to apply pressure to fluid in said chamber, a first valve means permitting fluid flow from said container into the lower end of said chamber, but preventing reverse fluid flow, an internally threaded actuator threadedly engaged with said external thread and rotatable with respect to said cylinder to store potential energy in said spring means and to effect fluid flow through said first valve means into said chamber, and a second valve means operable by a finger of the hand holding said container to permit discharge of pressurized fluid from said pump chamber and through said cylinder in response to shifting of said cylinder and its chamber in said one direction by said spring means.

## 4,147,281
## TOY SODA JET DISPENSER WITH MOVING DISPLAY

Maria Missale, and George Spector, both of 3615 Woolworth Bldg., 233 Broadway, New York, N.Y. 10007

Filed Jul. 12, 1976, Ser. No. 704,341
Int. Cl.[2] B67D *5/06*
U.S. Cl. 222—192 2 Claims

1. A soda dispenser and movable display comprising a transparent bowl for soda having a dispensing spout, including a base supporting said bowl, including a transparent cover for said bowl, said base comprising a housing enclosing an electric

motor in combination with an impeller pump assembly having a vertical tube extending into said bowl, said pump being magnetically driven by said motor including an electric extension for providing electric power to said motor in further combination with a rotatable display externally mounted on

said cover, in combination with rotatable member mounted on said tube reacting to the force of a soda jet from said tube to cause the rotary movement of said member, wherein said member and display include coacting magnetic means whereby rotary movement of said member causes rotary movement of said display.

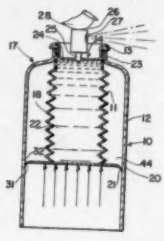
---

**4,147,282**

## VACUUM ACTUATED PRESSURIZED FLUID DISPENSER

**Sidney Levy, 145 W. Cuthbert Blvd., Oaklyn, N.J. 08107**

**Filed Jun. 6, 1977, Ser. No. 803,478**
**Int. Cl.[2] B67D *5/54***
**U.S. Cl. 222—387** **20 Claims**



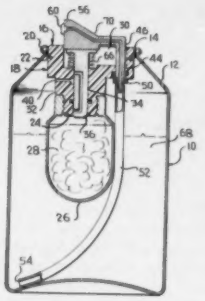
1. A pressurized fluid dispenser comprising an inner axially collapsible container gravity fillable with said fluid to be dispensed, an outer surrounding container defining an annular space between the inner and outer containers capable of being evacuated, means on said dispenser to permit evacuation of the space between the inner and outer containers, piston means for imposing pressure on said inner container to expel its contents, said piston means acting within said outer container and sealably attached therewith and being movable coaxially or paraxially of said inner container, said piston means having one surface exposed to the atmosphere and an opposite surface exposed to said evacuatable space and against said inner container valve means for controlling the egress of the contents of said inner axially collapsible container, said inner axially collapsible container having a projected area perpendicular to its axis sufficiently less than the projected area of said piston means perpendicular to the axis of said inner axially collapsible container that the action of the atmosphere on said piston means when said annular space is evacuated presses said piston means against said inner axially collapsible container to controllably expel the contents of said axially collapsible inner container through said valve means without the necessity of pressurized filling of said inner, axially collapsible container.

**4,147,283**

## COMBINED CHARGING AND PRODUCT DISPENSING UNIT

**Carmen T. Mascia, Clarendon Hills, and Gary K. Hasegawa, Chicago, both of Ill., assignors to The Continental Group, Inc., New York, N.Y.**

**Filed Sep. 21, 1977, Ser. No. 835,241**
**Int. Cl.[2] B05B *9/04*; B65D *83/14***
**U.S. Cl. 222—399** **7 Claims**



6. A combined charging and product dispensing unit comprising a valve body, mounting means on said valve body for mounting said valve body within a container, attaching means carried by said valve body for securing a container of pressurized gas to said valve body, a gas outlet in said valve body, a valve member having a gas passage therethrough for simultaneous communication with the interior of a gas container and said gas outlet, an actuator connected to said valve member for moving said valve member to a position communicating an associated gas container with said gas outlet, a product discharge tube depending from said valve body for extending into and receiving a fluid product to be dispensed, and a discharge nozzle in communication with said discharge tube for receiving a product from said tube, said discharge nozzle being in constant communication with said discharge tube and carrying said discharge tube.

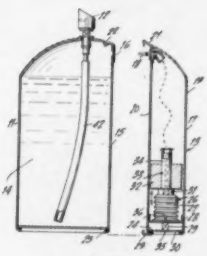
---

**4,147,284**

## AIR PROPELLANT-AEROSOL DISPENSER AND COMPRESSOR

**John V. Mizzi, P.O. Box 455, Old Bedford Rd., Goldens Bridge, N.Y. 10526**

**Filed May 25, 1977, Ser. No. 800,321**
**Int. Cl.[2] B65D *83/14***
**U.S. Cl. 222—401** **6 Claims**

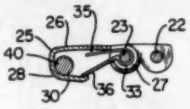


1. An aerosol dispenser employing air as the propellant for the product to be expelled comprising a hollow housing having a top, a bottom and side wall, a vertically reciprocable combined pump and reservoir assembly carried within the housing, an elongated slot in the housing side wall, a fitting connected at one end to the reservoir and in communication with the

interior thereof, a dispensing valve carried by the housing, a dip tube disposed within the reservoir at one end and connected to the nozzle at its other end, and pump means operatively coupled between the housing and the reservoir.

---

**4,147,285**
**SPRING CLIP FOR JEWELRY BAND**
**Samuel M. Bobrick, 445 Monaco, Denver, Colo. 80220**
**Filed Jan. 6, 1977, Ser. No. 757,454**
**Int. Cl.[2] A44C *5/14***
**U.S. Cl. 224—177** **6 Claims**



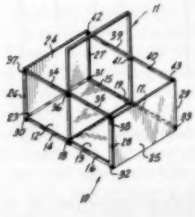

1. In a wristband having a relatively thin, flat flexible section adapted to conform to a wearer's wrist and provided with a connecting pin at one end of said section, at least the one end thereof adapted for releasable connection of an end connecting bar on a jewelry tip and the like, the improvement comprising:

a unitary end retainer having one side pivotally connected to said connecting pin secured to the one end of said flexible section and an opposite side defining a curved return portion terminating in a free end spaced from the one side to form an entrance for insertion of an end connecting bar, and

a spring closure positioned within the end retainer and said spring closure including a closed connecting end of generally circular configuration pivotally connected to said connecting pin at the one end of said flexible section whereby said spring closure and said end retainer have a common pivotal connection and are pivotal in unison about said connecting pin, and flat leaf spring portions forming divergent continuations of said connecting end, one spring portion being of a length to extend between opposite sides of said end retainer, said one spring portion having its outermost edge of divergent extension biased against the inner surface of said free end and the other spring portion biased to incline in a direction away from said one spring portion toward the one side of said end retainer when said one spring portion is depressed whereby the end connecting bar may be forced past the outermost edge of said one spring portion for disposition within the curved return portion of the end retainer.

---

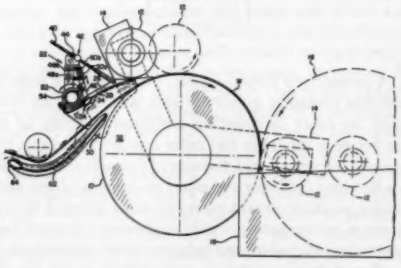
**4,147,286**
**COLLAPSIBLE HAND CARRIER**
**Claude F. Bates, III, and Duane R. Olson, both of 17801 SW. 112 Pl., Miami, Fla. 33157**
**Filed Dec. 5, 1977, Ser. No. 857,294**
**Int. Cl.[2] A47G *23/06***
**U.S. Cl. 224—48 D** **1 Claim**



1. A collapsible hand carrier comprising, in combination, a rectangular handle member of inverted, U-shaped configuration defining a substantially flat plane, a pair of rectangular bottom panel members, means pivotally journalling marginal inner edge portions of said bottom panel member along a lower edge portion of said handle member, a pair of rectangular side panel members, means pivotally securing said side panel members along one edge each with respect to outer marginal edge portions of said bottom panel members, and parallel guide mechanism interconnecting vertical edge portions of said rectangular handle member with opposed upper edge portions, respectively, of said side panel members to permit the upward folding of said bottom panel members and said side panel members against opposite sides of said handle member, said parallel guide mechanism comprising elongated link members pivotally interconnecting said vertical edge portions of said rectangular handle member with said upper edge portions of said side panel members, one of said bottom panels having an extended portion adapted to overlay the underside of the other of said bottom panel members when said hand carrrier is in its extended position of use, said bottom panels and said side panels being of sheet metal, and said bottom panel extended portion being provided with a hand grip opening to facilitate carrying when the hand carrier is fully collapsed, said handle member and said link members being fabricated of flat metal bar stock, said means pivotally journalling said bottom panel members to said handle member, and said means pivotally securing said side panel members to said bottom panel members each comprising rectangularly bent flange portions formed along marginal edge portions of said bottom panel members and said side panel members.

---

**4,147,287**
**REEL THREADING SYSTEM**
**Imants Reba, Vancouver, Wash., assignor to Crown Zellerbach Corporation, San Francisco, Calif.**
**Filed Jan. 5, 1978, Ser. No. 866,980**
**Int. Cl.[2] B65H *25/06***
**U.S. Cl. 226—7** **7 Claims**



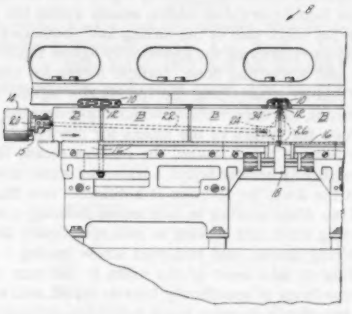
1. In a web reel system including a rotatable reel drum having a cylindrically-shaped outer surface, and a rotatable reel spool for receiving web material from said drum and selectively movably mounted relative to the drum between a start-up position wherein the spool forms a nip with the drum, and a web winding position wherein the spool is spaced from the drum and web material wound about said spool, the improvement comprising reel threading means operatively associated with said spool and drum, said threading means including at least one Coanda nozzle adapted to induce a gaseous flow about the periphery of said drum for entraining a web introduced into said gaseous flow and directing same between said drum and said spool.

4,147,288

## SIDE SEAM SOLDERING MACHINE WITH MEANS FOR PROTECTING PRE-STRIPING

Frederick S. Sillars, Beverly, Mass., assignor to USM Corporation, Farmington, Conn.

Filed Feb. 3, 1978, Ser. No. 874,804
Int. Cl.[2] B23K 1/16
U.S. Cl. 228—43 7 Claims



1. In a machine for soldering seam joints of successive bodies and of the type comprising a continuously operable solder applicator and means for feeding the successive bodies with their seam joints aligned and spaced along a path to receive molten solder from the applicator, a solder deflecting member mounted on the opposite side of said path from the solder applicator for movement into position to block flow of the solder therefrom into the gap between the ends of adjacent seam joints, means urging the member away from the path, and mechanism operable by said feed means to move the solder deflecting member against the influence of said urging means into said solder blocking position.

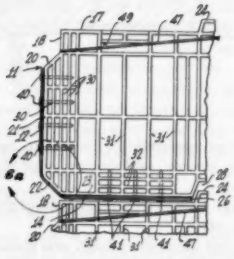
---

4,147,289

## PRODUCE LUG BOX WITH CORED-OUT PLASTIC END WALLS OVERLAPPED BY SIDE AND BOTTOM BODY WRAPPER

Walton B. Crane, Sherman Oaks, Calif., assignor to Industrial Designs & Services, Encino, Calif.

Filed Sep. 26, 1977, Ser. No. 836,612
Int. Cl.[2] B65D 5/02, 85/34, 21/02
U.S. Cl. 229—23 R 3 Claims



1. A lug box for holding produce and the like comprising:

a pair of parallel and generally rectangular plastic end walls defining opposite ends of said box, each of said end walls being approximately 75 to 80 percent cored-out, having top, bottom and side edges, angled shoulders joining said edges and a plurality of paralle, horizontal and vertical ribs adjacent said bottom and side edges;

a wrapper extending between and overlapping said bottom and side edges of said end walls and forming a bottom and sides for said box, said wrapper being formed by a plurality of layers of wood filler and a veneer of kraft paper adhesively joined to said wood filler;

a plurality of nails driven through said wrapper and into said ribs, said nails being substantially perpendicular to said ribs and securing said wrapper to said end walls; and

a generally rectangular cover forming a top for said box, said cover being relatively stiff but bendable along two pairs of convergent score lines, said score lines defining downwardly bent triangular outside portions having dependent tabs, and said end walls defining pockets in which said tabs are received.

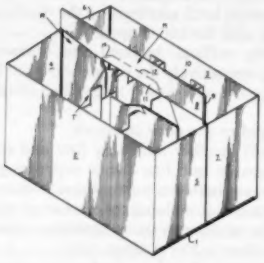
---

4,147,290

## ARTICLE CARRIER HANDLE STRUCTURE

James T. Stout, Doraville, Ga., assignor to The Mead Corporation, Dayton, Ohio

Filed May 19, 1978, Ser. No. 907,546
Int. Cl.[2] B65D 5/46
U.S. Cl. 229—52 B 8 Claims



1. In an article carrier, handle structure comprising a handle panel, a hand flap struck from said handle panel and foldably joined thereto along a substantially horizontal fold line, a connecting element having upper and lower edges and being integrally joined at one end thereof to said handle panel and at the other end thereof to one end of said hand flap, said upper and lower edges of said connecting element being angularly disposed to said horizontal fold line and downwardly inclined from said one end of said hand flap, and said hand flap being adapted to swing out of the plane of said handle panel and thereby to cause said connecting element to rotate.

---

4,147,291

## PACKING BAG FOR LIGHT-SENSITIVE MATERIAL

Mutsuo Akao, and Taichi Kurechi, both of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Apr. 7, 1977, Ser. No. 785,709
Claims priority, application Japan, Apr. 7, 1976, 51-427762[U]
Int. Cl.[2] B32B 15/08, 27/08; B65D 65/40, 83/02
U.S. Cl. 229—55 19 Claims

1. A packing bag for light-sensitive materials which comprises a cross laminate film of two uniaxially stretched high density polyethylene films wherein the stretching directions of the two films cross each other at an angle of about 45° to about 90° and a low density polyethylene film containing a light-intercepting agent and an antistatic agent, wherein for low density polyethylene film surface of said cross laminate is the interior surface of said bag.

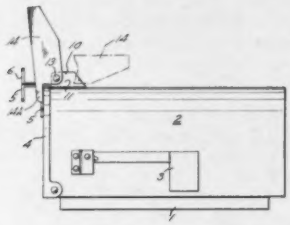
2. The packing bag of claim 1 including at least one additional layer selected from the group consisting of a layer of a low density polyethylene film cloth, paper, cellophane, a synthetic resin sheet, a flat yarn and aluminum foil.

4. The packing bag of claim 1 wherein the high density polyethylene films are heat-sealed to one another for lamination.

## 4,147,292
## MAILBOX FLAG DEVICE

Baxter Fisher, Rte. 3, Box 285, Springfield, Oreg. 97477

Filed Dec. 12, 1977, Ser. No. 859,331
Int. Cl.[2] A47G 29/12
U.S. Cl. 232—35 1 Claim



1. A flag device for attachment to a rural mailbox of the type having cooperating latch members on the mailbox and mailbox door structure, said device comprising,

a flag having vertical, inclined and horizontal positions indicating respectively the presence of mail in the mailbox for pickup, the non visited and visited status of the mailbox,

a clip attached to the door structure,

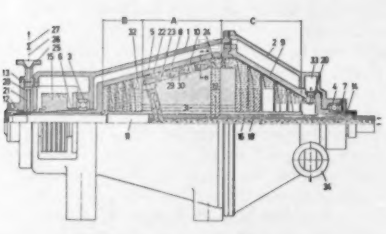
a flag support member including first and second flanges, pivot means on said first flange supporting said flag for arcuate travel between vertical and horizontal positions, said second flange defining relieved areas enabling securement to the mailbox by those fasteners securing one of the latch members to the mailbox, and

said flag having a first lower edge for supported contact with the mailbox door mounted clip to hold the flag in a vertical position, said flag having a second lower edge for alternate contact with the mailbox door mounted clip, said second lower edge in angular relationship to said first edge and thereby adapted to hold the flag in a manually preset inclined position when there is no pickup mail in the mailbox, said flag dropping to a horizontal position from its inclined position upon opening of the mailbox door structure to indicate the visited status of the mailbox.

## 4,147,293
## CONTINUOUSLY OPERATING SOLID-JACKET COUNTERFLOW CENTRIFUGAL EXTRACTOR

Heinrich Hemfort, Oelde, Fed. Rep. of Germany, assignor to Westfalia Separator AG, Oelde, Fed. Rep. of Germany

Filed Jan. 11, 1978, Ser. No. 868,552
Claims priority, application Fed. Rep. of Germany, Jan. 18, 1977, 2701763
Int. Cl.[2] B04B 1/20, 5/06
U.S. Cl. 233—7 18 Claims

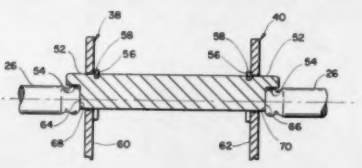


1. In a continuously operating counterflow centrifugal extractor suitable for extraction of a specifically heavier liquid containing solids with a specifically lighter liquid by mixing and separation of the two liquids comprising a rotatably mounted drum, means within the drum defining a mixing and contacting zone for the extraction, inflow means for the specifically heavier liquid and inflow means for the specifically lighter liquid for the introduction of the two liquids to the mixing and contacting zone for counterflow therethrough, means within the drum disposed on one side of the mixing and contacting zone for receiving and clarifying the specifically heavier liquid from the mixing and contacting zone, outflow means for clarified specifically heavier liquid from the specifically heavier liquid clarifying means, means within the drum disposed on the other side of the mixing and contacting zone for receiving and clarifying the specifically lighter liquid from the mixing and contacting zone, outflow means for clarified specifically lighter liquid from the specifically lighter liquid clarifying means, the improvement which comprises the drum tapering along the length of the means for clarifying of the specifically heavier liquid toward the outflow means for the clarified specifically heavier liquid, a transport screw mounted coaxially in the drum for rotation at a different rate than the rotation of the drum serving as said means defining a mixing and contacting zone, and serving as said specifically heavier liquid clarifying means, said transport screw having a taper corresponding to said taper of the drum in the area of the means for clarifying of specifically heavier liquid, said inflow means for specifically heavier liquid being for delivering the specifically heavier liquid to between the screw and the drum at the end of the mixing and contacting zone remote from the means for clarifying of the specifically heavier liquid, said inflow means for specifically lighter liquid being for delivery of the specifically lighter liquid to between the screw and the drum at the end of the mixing and contacting zone adjacent the means for clarifying the specifically lighter liquid, and contacting means between the spirals of the transport screw in the mixing and contacting zone for promoting the mixing and contacting therein.

## 4,147,294
## ROTOR CARRIER FOR MICROTITRATION PLATE

Howard R. Davidson, Menlo Park, and Brian J. Bayley, Palo Alto, both of Calif., assignors to Beckman Instruments, Inc., Fullerton, Calif.

Filed Feb. 22, 1978, Ser. No. 879,940
Int. Cl.[2] B04B 5/00
U.S. Cl. 233—26 5 Claims



1. A rotor carrier assembly for mounting between a pair of pivot junctions in a rotor, said carrier assembly comprising:

a support plate;

A pair of upright hanger members integrally connected to said support plate;

a single elongated member slidably and removably mounted through both of said pair of hanger members, each end of said elongated member having a flat portion and an extending open sided sleeve means for interface with a pair of respective pivot pins on said rotor, said flat portions of said elongated member being in face to face contact with the face surfaces of said pins to retain said carrier precisely centered between said pins, said elongated member not being rigidly attached to said hanger members; and

a retaining member securely connected to said elongated member adjacent the interior surfaces of each of said hanger members to prevent said hanger members from

moving on said elongated member toward each other during centrifugation.

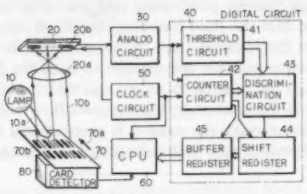
---

**4,147,295**

## METHOD AND APPARATUS FOR RECOGNIZING BAR CODES

**Tadao Nojiri, Kariya, and Akio Sugiura, Nagoya, both of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan**

**Filed Jul. 6, 1977, Ser. No. 813,426**
**Claims priority, application Japan, Aug. 18, 1976, 51-98414**
**Int. Cl.[2] G06K *7/14, 9/13***
**U.S. Cl. 235—463** **12 Claims**




1. In combination with an object carrying a bar code having a plurality of bars which are arranged in white and in black alternately to extend parallelly and have two bar widths, a bar code recognition system comprising:

a sensor for scanning said bar code transversely at a constant speed to produce a train of signals indicative of said bars;

a reshaping circuit, connected to said sensor, for reshaping said signals into a train of rectangular signals having a first and a second output level corresponding to said bars in white and in black respectively, and having time widths proportional to respective widths of said bars;

a threshold circuit, connected to said reshaping circuit, for determining a first and a second threshold value in proportion to respective total time widths of said first and second output levels of said rectangular signals; and

a discriminating circuit, connected to said threshold and measuring circuit, for comparing the output value of said measuring circuit with a corresponding one of said first and second threshold values, whereby the width of each of said bars is discriminated to decode said bar code.

6. A method for recognizing a bar code having a plurality of bars recorded parallelly on an object in two different light reflective colors and in two different widths comprising the steps of:

supplying light on said object;

scanning the density of light reflected by said bar code at a constant speed in a direction transverse to the longitudinal direction of each of said bars to produce detection signals changing the signal level between two predetermined levels at the change of the density of scanned light, said two predetermined levels corresponding to said two different colors, respectively;

measuring two total time periods in which said detection signals are kept at said respective predetermined levels in one cycle period of said scanning step:

determining two threshold values in proportion to said two total time periods, respectively;

storing said two threshold values during said one cycle period of said scanning step;

measuring each time period in which said detection signals are kept at said two predetermined levels; and

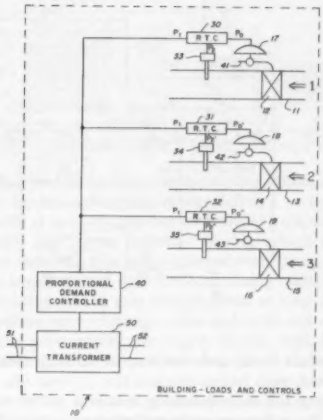
comparing said each time period with a corresponding one of said two threshold values to thereby discriminate the width of each of said bars.

**4,147,296**

## PROPORTIONAL DEMAND LIMIT CONTROLLER

**Donald H. Spethmann, Arlington Heights, Ill., assignor to Honeywell Inc., Minneapolis, Minn.**

**Filed Dec. 9, 1977, Ser. No. 859,505**
**Int. Cl.[2] G05D *23/12***
**U.S. Cl. 236—1 B** **20 Claims**




1. An apparatus for limiting the power consumption of a building's loads below a predetermined demand limit, at least one of said loads controlling the condition of air within a building, said apparatus comprising at least:

condition sensing means for providing a first output dependent upon a condition of said air;

load control means adapted to control said at least one of said loads in accordance with the condition being sensed;

proportional demand controller means for sensing power consumption of said loads and for providing a second output dependent upon the approach of said power consumption to the predetermined demand limit; and,

reset means connected to said condition sensing means for receiving said first output, connected to said proportional demand controller means for receiving said second output, and connected to said load control means, said reset means controlling said load control means in accordance with said first output, said second output resetting said load control means to maintain said power consumption below said predetermined demand limit.

---

**4,147,297**

## LAUNDRY MACHINE IMPROVED WATER TEMPERATURE CONTROL AND METHOD

**Joseph C. Worst, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.**

**Filed Oct. 3, 1977, Ser. No. 839,135**
**Int. Cl.[2] G05D *11/16***
**U.S. Cl. 236—12 A** **10 Claims**

1. In an automatic washer having an inlet hot water valve and an inlet cold water valve, the improvement in controlling the temperature of fill water comprising:

(a) means to keep the inlet hot water valve continuously open during fill,

(b) means to keep the inlet cold water valve normally closed during fill,

(c) first means for sensing a first predetermined temperature level of incoming hot water,

(d) second means for sensing a second predetermined level of incoming hot water, said second temperature level being lower than the first temperature level,

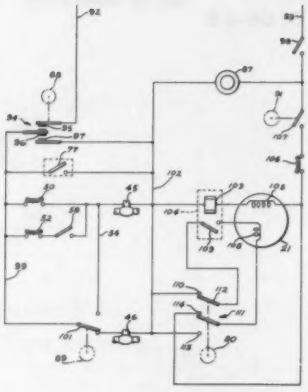
(e) switch means to bypass the second means for sensing the

second predetermined temperature level of the incoming hot water, and

(f) control means to open the cold water valve when,

(i) both the hot water temperature is above the first temperature level and the second sensing means is by-passed, and

(ii) when the second sensing means is not by-passed and the hot water temperature is above the second temperature level.



---

**4,147,298**

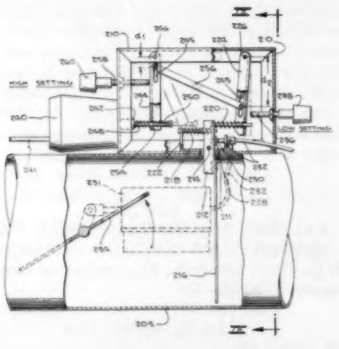
## FLUID FLOW CONTROLLER

**Louis J. Leemhuis, 1855 Sherington Pl., Apt. M214, Newport Beach, Calif. 92663, assignor to Leemhuis, Louis J., Newport Beach, Calif.**

**Continuation-in-part of Ser. No. 711,066, Aug. 2, 1976, abandoned. This application Feb. 22, 1978, Ser. No. 880,299**

**Int. Cl.[2] F24F** *7/06*

**U.S. Cl. 236—49** **15 Claims**



7. In a pneumatically operated damper controller for positioning a damper disposed to control the flow of fluid through a conduit having a pneumatic motor connected to position the damper as a function of the pressure within a pressurized pneumatic line connected to the pneumatic motor, the improved controller for maintaining the volume of fluid flowing through the conduit constant comprising:

(a) a bleed member connected into the pneumatic line connected to the pneumatic motor including a bleed orifice for bleeding fluid from the pneumatic line to reduce the pressure therein;

(b) a movable member including a seat adapted for movement between a first position wherein said orifice is closed by said seat and a second position wherein said orifice is open to its full bleed capacity;

(c) a first bias means connected to said movable member for biasing said movable member toward said first position;

(d) a second bias means connected to said movable member for biasing said movable member toward said second position, said second bias means being adapted to overcome said first bias means whereby said movable member is biased in said second position by a bias force equal to the difference between the bias forces of said first and second bias means; and,

(e) a movable vane disposed within the conduit to respond to the pressure of fluid flowing therethrough, said vane being operably connected to said movable member to move said movable member toward said first position in response to increases in pressure of the fluid flowing through the conduit thereby positioning said seat relative to said orifice so that the fluid bleeding therefrom causes the pressure in the pneumatic line to the pneumatic motor to be an amount to position the damper to limit the flow of fluid through the conduit to an amount which puts the system in equilibrium whereby the constant flow volume of fluid flowing through the conduit is proportional to the difference between said first and second bias forces.

---

**4,147,299**

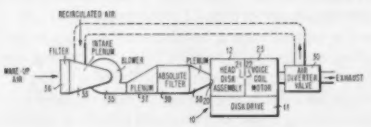
## AIR FLOW SYSTEM FOR A DISK FILE

**Marshall E. Freeman, San Jose, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed Sep. 26, 1977, Ser. No. 836,459**

**Int. Cl.[2] H01B** *7/34;* **H01L** *25/04*

**U.S. Cl. 236—49** **5 Claims**



1. In an air flow system for a disk file in which air is supplied to at least one rotating magnetic disk to maintain the surfaces thereof free from contaminants which may be generated as a result of at least one magnetic transducer being in sliding contact with a disk surface and in which the same air is employed to cool components employed in the head positioning mechanism, an improved arrangement for controlling the temperature of the air being circulated through said air flow system, said arrangement comprising:

(1) a blower having an inlet port and an outlet port;

(2) an air intake plenum having (A) an outlet port connected to said inlet port of said pump, a first inlet port for receiving filtered air, and (B) a second inlet port for receiving recirculated air;

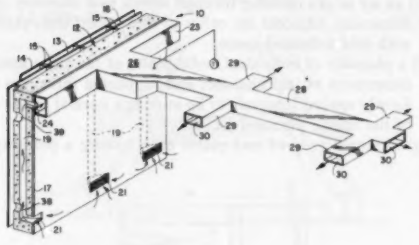
(3) a filter disposed in said first inlet port of said air intake plenum operable to provide filtered make-up air for said system when the pressure in said intake plenum drops below atmospheric;

(4) air flow diverter means including an inlet opening for receiving air circulated past said disk and said components of the head positioning mechanism; first and second outlet ports, one of which is positioned to exhaust circulated air to atmosphere and the other of which is connected to said second inlet port of said air intake plenum, and means responsive to the temperature of the air being circulated in said system for controlling the volume of air supplied to each said first and second outlet ports, whereby the pressure in said air intake plenum is varied above and below atmosphere, to control the volume of lower temperature make-up air added to the system.

## 4,147,300
## METHOD AND STRUCTURE FOR SOLAR HEATING

William W. Milburn, Jr., Boulder, Colo., assignor to Thomas W. O'Rourke, Boulder, Colo.

Filed Dec. 8, 1976, Ser. No. 748,588
Int. Cl.[2] F24J 3/02
U.S. Cl. 237—1 A 16 Claims



1. A radiant energy collection and storage system comprising;

a cementitious wall of a thickness sufficient to be self supporting;

at least one channel defined in and extending through the interior of the wall in a direction having a predominantly vertical component;

a panel substantially opaque to infrared radiation but at least translucent to ultraviolet radiation mounted spaced from but adjacent to an outer surface of the comentitious wall with the panel being connected to the wall to define a substantially closed volume;

a solid radiant energy absorbing surface of substantially the same size as the panel positioned within the volume defined by the panel and the adjacent surface of the cementitious wall;

an inlet opening defined in the wall and communicating with at least one channel;

an outlet opening defined in the wall and communicating with the same channel as does the inlet opening;

conduit means connected to the outlet opening; and

spaced openings communicating between at least one channel and the surface of the wall adjacent the panel, one such spaced opening being positioned at an upper portion of the wall and another such spaced opening being positioned at a lower portion of the wall;

whereby radiant energy may be collected at the radiant energy absorbing surface and conducted as sensible heat into the cementitious wall for storage or alternatively conducted from the wall by fluid flow through the channel and into the conduit means.

15. A method of collecting and storing radiant energy comprising;

absorbing radiant energy at a radiant energy absorbing collector adjacent to but spaced from a cementitious wall to produce sensible heat;

transferring the sensible heat produced by absorbing the radiant energy into the adjacent cementitious wall by convection by flowing air to and from the confined volume defined by the collector and the adjacent cementitious wall, through openings communicating with the channels, and through the channels;

inducing a flow of fluid through channels defined through the interior of the cementitious wall;

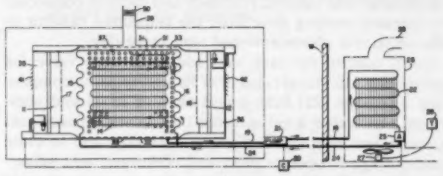
heating the fluid induced through the channels from the sensible heat transferred into the cementitous wall; and

flowing the fluid to a desired location spaced from the wall.

## 4,147,301
## HEATING SYSTEM

Wayne G. Halma, 421 E. 7th, and Dale A. Snyder, 918 W. 7th, both of Mitchell, S. Dak. 57301

Filed Apr. 13, 1977, Ser. No. 787,498
Int. Cl.[2] F24D 3/00
U.S. Cl. 237—8 R 12 Claims

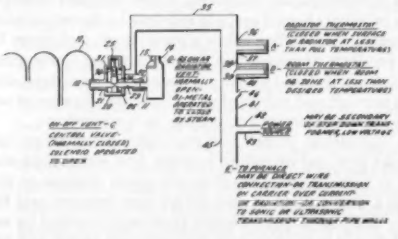


1. A heating system having communicating means leading to space to be heated comprising means defining a closed compartment with at least one gas burner assembly disposed in the compartment, said burner assembly having a high heat conducting and radiating flue gas discharge wall facing the interior of said compartment, said wall containing multiple perforations, a heating coil in said compartment at least in closely adjacent radiant heat exchange with said wall and extending planar to and substantially the length of said wall, a holding coil in said compartment positioned separate from and inwardly of said heating coil and connected at one end to one end of said heating coil, a heat collector coil disposed in an enclosure in said space to be heated connected to said ducting, means for forcing air to be heated over said heat collector coil into said ducting, a heating liquid supply conduit connecting the other end of said holding coil to one end of said heat collector coil, a heating liquid return conduit connecting the other end of said heat collector coil to the other end of said heating coil, thus providing a closed circuit between and including said coils containing a heating liquid, a motor driven pump in said supply line adapted when actuated to force liquid from said holding coil toward said heat conduit, means responsive to a drop in the temperature in said heat collector coil below a predetermined lower value for energizing said burner and actuating the pump to circulate heating fluid through said circuit and for stopping such circulation and inactivating the burner when that temperature raises to a predetermined higher value, said heating and holding coils being subject to direct heating from said burner and there being means at said compartment for forcing hot flue gases from said burner through said holding coil before exhaust.

## 4,147,302
## HOME HEATING SYSTEM CONTROL

Irwin Gray, 175-14 73rd Ave., Flushing, N.Y. 11366

Continuation-in-part of Ser. No. 588,199, Jun. 19, 1975, abandoned. This application Dec. 1, 1976, Ser. No. 746,549
Int. Cl.[2] F24D 1/00
U.S. Cl. 237—9 R 4 Claims



1. A heating system comprising:

a plurality of radiators (10), each having an inlet end and an

outlet (12); a source of steam (G); conduits (100, etc.) connecting said source of steam to said inlets of all said radiators; each said radiator having a vent valve (B) at its said outlet, such that steam from said source of steam passes through said connecting conduits and drives any air in each said radiator through its said vent valve; means (15) for closing each said vent valve when steam in the radiator reaches said vent valve;

an additional vent valve (C) for each said radiator connected to transmit venting flow from the respective radiator to the respective aforementioned vent valve (B);

an on-off control for each said additional vent valve for permitting individual control of its said radiator comprising: a passage (21) from a said radiator to its said additional vent valve; a valve means (24) located in each said passage and operable to open said passage and to close said passage to open or close said additional vent valve;

said valve means when closed, blocking access to its said additional vent valve from its said radiator and thereby preventing passage of air from said radiator through said first mentioned vent valve (B), thereby blocking the entry of steam in said radiator; said valve means when open, permitting the steam to drive air through both said vent valves, thereby permitting steam to enter said radiator;

said valve means comprising means (25) applying a closing bias on said additional vent valve independently of room temperature and further comprising electrical means (31) to operate said valve to an open position;

and a room thermostat (D) located in the area in which a said radiator is positioned;

electrical connection means (35, etc.) from said room thermostat to said valve electrical means for operating said valve and causing said valve to open at a predetermined temperature;

means including said room thermostat (D) for controlling said steam source (G) to cause steam to enter said conduits and to stop additional steam from entering said conduits; said latter means comprising transmitting means (E) for transmitting a signal from said room thermostat to said steam source for controlling the steam source to start the entry of steam into said conduits at said predetermined temperature and to halt entry of steam into said conduits at another, higher, predetermined temperature;

whereby when said room thermostat causes a signal to halt the entry of steam into said conduits, the said electrical means is deenergized thereby causing said additional vent valve to close.

---

**4,147,303**

## HEAT-SAVING SMOKE PIPE ATTACHMENT

**Anthony Talucci, 2045 Valley Dr., Syracuse, N.Y. 13207**

**Continuation-in-part of Ser. No. 792,226, Apr. 29, 1977, abandoned. This application Dec. 20, 1977, Ser. No. 862,433**

**Int. Cl.[2] F24B 7/04**

**U.S. Cl. 237—55** **3 Claims**

1. A heat saving attachment for a central heating system including a furnace located in a relatively unheated space and having a thermostatically controlled burner operable to supply heat to a relatively heated space in response to the temperature in said heated space falling below a preset level, a chimney for venting products of combustion from said burner to the atmosphere, and a cylindrical smoke pipe extending for a given axial distance through said unheated space from said furnace to said chimney, said attachment comprising, in combination:

(a) a cylindrical jacket concentrically surrounding said smoke pipe and extending between first and second ends for an axial distance less than said given distance to provide a first portion of said smoke pipe between said furnace and said jacket, a second portion surrounded by said jacket, and a third portion between said jacket and said chimney, both said smoke pipe and said attachment lying entirely within said unheated space;

(b) said first and third portions of said smoke pipe being of the same diameter and said second portion being of larger diameter;

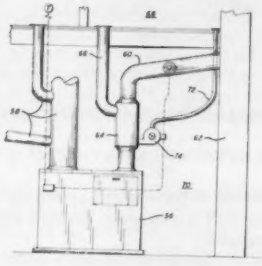
(c) means substantially sealing said first and second ends of said jacket to the exterior of said smoke pipe, thereby providing an enclosed, annular chamber of substantially constant transverse dimension between the exterior of said smoke pipe and the interior of said jacket;

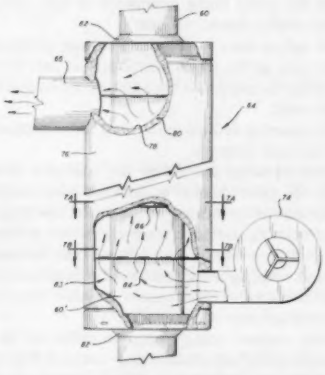
(d) a duct communicating at one end with said chamber, adjacent one of said sealed ends thereof, and at the other end with said heated space;

(e) an air intake opening through which said chamber communicates, adjacent the other of said sealed ends thereof, with said unheated space;

(f) a plurality of individual, solid plates of the same annular dimensions as said chamber and supported therein at uniformly spaced intervals to lie in planes normal to the axis of the smoke pipe and jacket;

(g) alternate ones of said plates each having a plurality of





first openings spaced about the outer periphery and extending inwardly from said jacket for a first portion of the radial dimension of said chamber;

(h) alternate plates intermediate of said ones each having a plurality of second openings spaced about the inner periphery and extending outwardly from said smoke pipe for a second portion of the radial dimension of said chamber, said second openings being axially misaligned with respect to said first openings;

(i) an air circulating fan disposed to force movement of air into said intake opening, through said annular chamber and into said duct;

(j) an electric motor actuable to drive said fan;

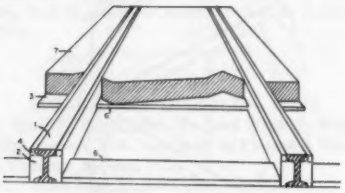
(k) switch means movable to actuate and deactuate said motor; and

(l) timer means operable to close said switch means for actuation of said motor in response to and a predetermined time delay after actuation of said burner and to open said

switch means for deactuation of said motor in response to and a predetermined time delay after deactuation of said burner.

---

**4,147,304**
**RAILROAD CROSSING AND PROCESS FOR FABRICATION THEREOF**
**Benjamin G. Blyton, 5391 Paris Pike, Lexington, Ky. 40511**
**Filed May 23, 1977, Ser. No. 793,147**
**Int. Cl.[2] E01C *9/04***
**U.S. Cl. 238—8** **2 Claims**



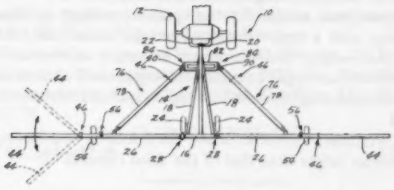
1. A method of constructing a concrete roadway crossing for a railroad comprising the steps of,
installing on both sides of each rail a layer of polyethylene or polyurethane compressible foam material having a minimal two pound foam density along the rail flangeways, rail ties, and track hardware, so as to fully cover those portions thereof normally exposed to direct contact with the concrete crossing, said layer precluding direct contact between the concrete of said concrete crossing and the rails and ties,
leveling the rail bed so that the land area between the ties is coplanar with the top surface of the tie,
pouring concrete over both the ties and the rail bed therebetween in the area defined by the rails and in the area defined by the rails and adjacent roadway, said concrete making direct contact with the land area between the ties and the layer of compressible foam material,
allowing the concrete crossing thus constructed and being supported only on the land area between the ties to harden to traffic bearing strength.

2. A railroad grade crossing consisting of;
A. A railroad crossing base or sub-grade,
B. Superimposed on the base, a set of rails, ties, and track hardware which secure said rails to said ties,
C. A compressible foam material covering the entire top surfaces of all rail ties and covering the entire rail flangeways, including said track hardware and,
D. Paving material constituting the upper surface of said grade crossing, said paving material positioned over the compressible foam and supported solely by the sub-grade between the ties.

---

**4,147,305**
**SPRAY DRAWBAR**
**Larry L. Hunt, Rural Route, Hartford, Iowa 50118**
**Filed Sep. 12, 1977, Ser. No. 832,397**
**Int. Cl.[2] B05B *1/20***
**U.S. Cl. 239—167** **6 Claims**

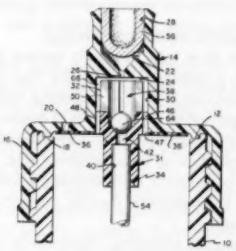
1. A collapsible spray drawbar device, comprising,
a frame means having a forward end and a rearward end, said forward end being adapted for pivotal connection to a prime mover,
first wheel means mounted to said frame means for engagement with the ground,
a pair of spray bar elements connected to said rearward end of said frame means at laterally spaced apart positions, each spray bar element connected for pivotal movement between an operating position wherein said spray bar element is extended transversely from said frame means and a transporting position wherein said spray bar element is extended approximately parallel to the longitudinal axis of said frame means,
a pair of second wheel means, each mounted to a respective one of said spray bar elements for engagement with the ground,
a pair of extension bar elements, each said extension bar element pivotally and detachably mounted to a respective one of said spray bar elements so as to be a linear extension of said spray bar elements,



each said extension bar element being mounted to said respective spray bar element by hinge means, said hinge means being a double-jointed hinge pivotally connected by shear pins so that said extension bar element pivots about said hinge means upon striking an immovable object, and
a pair of support bar elements, each said support bar element detachably and pivotally mounted to said frame means and to a respective one of said spray bar elements.

---

**4,147,306**
**FOAM PRODUCING APPARATUS**
**Robert S. Bennett, 170 Sturbridge Rd., Easton, Conn. 06425**
**Filed Sep. 28, 1977, Ser. No. 837,557**
**Int. Cl.[2] B67D *5/58***
**U.S. Cl. 239—327** **6 Claims**



1. A device for producing foam from a foamable liquid and air, said device comprising:
a deformable vertical reservoir having an open neck and adapted to contain a quantity of foamable liquid and air;
a first vertically elongated member provided with an enlarged lower end engaging the neck and having a flat horizontal bottom surface covering the neck, said lower end having a first vertical channel extending from the outside of the member therethrough to communicate with the bottom surface, said first member having a first chamber with a first upper section having a circular top opening flush with the top of the first member and a second lower section having a bottom circular opening flush with the bottom surface, said first and second sections being interconnected by a second vertical channel, both sections having vertical cylindrically shaped inner walls, the inner wall of the first section tapering inwardly in the vicinity of the second channel;
a second vertically elongated member having upper and lower extensions disposed respectively within and spaced

from the second section and the reservoir respectively, said second member having a flat circular flexible horizontal washer disposed between said extensions and extending radially outward along the bottom surface past the first channel, said second member having a second chamber with a third upper section disposed in the upper extension and communicating with a top opening in the upper extension, said second chamber having a fourth lower section disposed in the lower half and communicating with a bottom opening in the lower extension, the third and fourth sections being interconnected by a third vertical channel, said washer having spaced openings communicating with a region intermediate the inner wall of the second section and the upper extension of the second member, said upper extension having spaced vertical slots communicating between said region and said third section; and

a ball vertically movable in the third section and having a diameter larger than that of the third channel.

---

**4,147,307**

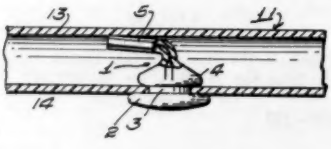
## MULTIPLE EMITTER FLOW CONTROL

**Mark H. Christy, 1534 E. Edinger, Santa Ana, Calif. 92705, and Lloyd Spencer, 220 Patrician Way, Pasadena, Calif. 91105**

**Continuation-in-part of Ser. No. 728,998, Oct. 4, 1976, abandoned. This application Mar. 31, 1977, Ser. No. 783,291**

**Int. Cl.[2] B05B** *15/02*

**U.S. Cl. 239—542** **15 Claims**



1. A drip irrigation means, comprising:

a. an elongated flow tube normally having between irrigation cycles, a collapsed essentially flat profile forming closely spaced relatively flat opposing wall portions, one of which is provided with a series of outlets; the flow tube being readily expansible toward an essentially cylindrical profile on initiation of an irrigation cycle;

b. and a series of emitters, each defining a flush flow passage and a drip flow passage therein connected to a corresponding outlet;

c. the flow passages extending transversely within the flow tube and, at least the flush flow passage, being subject between irrigation cycles to at least partial closure by the wall portion opposite from the outlets to minimize intrusion of insects and dirt;

d. the flush flow passages being open on initiation and conclusion of an irrigation cycle to effect monentary flush flow, and closed during the irrigation cycle in response to water pressure within the flow tube thereby limiting flow to the drip flow passages.

---

**4,147,308**

## ROLLER MILL

**Bent E. Mikkelsen, Copenhagen, Denmark, assignor to F. L. Smidth & Co., Cresskill, N.J.**

**Filed Jul. 26, 1977, Ser. No. 819,403**

**Claims priority, application United Kingdom, Jul. 27, 1976, 31271/76**

**Int. Cl.[2] B02C** *15/04*

**U.S. Cl. 241—117** **25 Claims**

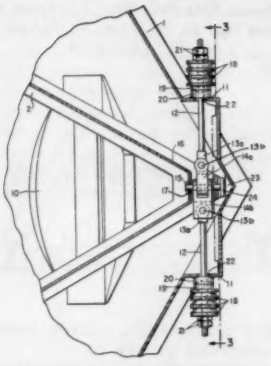
1. A roller mill which comprises:

a. a mill housing;

b. a rotary grinding table positioned within said housing and having an upper surface defining a grinding path;

c. at least one grinding roller disposed above said grinding table for engaged grinding rotation along said grinding path:

d. a pressure frame to suspend each grinding roller above said grinding table; and



e. means to guide said pressure frame relative to said housing, said guide means having resilient means positioned to resiliently restrain movements of said pressure frame to thereby reduce the transmission of vibrations from said pressure frame to said housing.

---

**4,147,309**

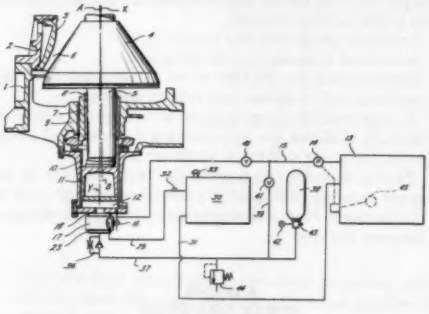
## HYDROSET PRESSURE RELIEF SYSTEM

**David Vroom, Tucson, Ariz., assignor to Duval Corporation, Houston, Tex.**

**Filed Jun. 29, 1977, Ser. No. 811,208**

**Int. Cl.[2] B02C** *2/04*

**U.S. Cl. 241—215** **10 Claims**



1. In a gyratory crusher having a fixed outer crushing wall and a rotatable inner crusher cone mounted on a vertically adjustable central supporting shaft and separated from the outer crushing wall by an adjustable gap, an improved pressure relief system comprised of two fluid assemblies and a relief valve piston, as follows: (a) a first fluid assembly for vertically adjusting the position of the crusher cone and the corresponding size of the crushing gap by means of hydraulic fluid controllably supplied from a hydraulic fluid reservoir to a cavity beneath the crusher cone central supporting shaft; (b) said relief valve piston attached to the crusher beneath said cavity, the top face of the piston being in contact with the hydraulic fluid supporting the crusher cone and central supporting shaft, which fluid thereby exerts a downward force on the piston; and (c) a second fluid assembly cooperating with the first by

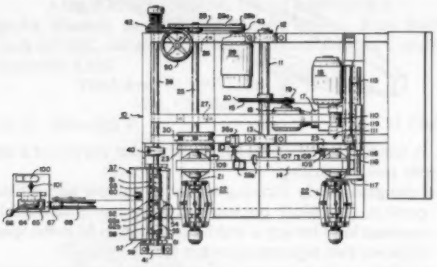
providing a preset back force on the bottom face of the relief valve piston, holding the piston upwards against a valve seat, such that the piston is forced downwards when the force exerted by the hydraulic fluid on the top of the piston valve exceeds the back force, thereby allowing the hydraulic fluid in the cavity above the piston to be discharged from that cavity, causing the crusher cone to be lowered and the pressure thereby reduced, the discharged fluid being removed from the cavity between the crusher cone central supporting shaft and the relief valve piston to a reservoir from which it can be controllably returned, independent of the closing of the relief valve piston, to the cavity beneath the crusher cone central supporting shaft to raise the crusher cone to its former operating position.

---

## 4,147,310
## APPARATUS FOR COILING WIRE

**David R. Harden, Washington, Pa., and Hugh E. Southerland, Connellys Springs, N.C., assignors to Piedmont Wire Corporation, Connelly Springs, N.C.**

**Filed May 17, 1978, Ser. No. 906,859**
**Int. Cl.² B65H** *54/02, 67/04, 75/24, 75/28*
**U.S. Cl. 242—25 A** **18 Claims**



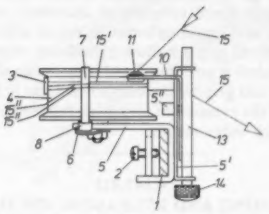
1. Apparatus for coiling wire, characterized in that the finished coils are free from central cores or spools and the wire may be removed from the axis free from undesirable lay, comprising a frame, a main shaft journaled for rotation in said frame, a plurality of radial arms on said shaft, first drive means rotating said shaft, a mandrel shaft journaled through the end of each said radial arm at the end remote from the main shaft, expandable mandrel means on each mandrel shaft, a mandrel drive shaft journaled in said frame spaced from the main shaft identifying a coiling station, releasable connecting means between each mandrel shaft and said mandrel drive shaft, a second drive means on the frame acting on the mandrel drive shaft for rotating the same, arm indexing means on the frame engaging and holding a radial arm with the mandrel shaft and mandrel drive shaft in coaxial alignment, wire directing means on the frame spaced from the mandrel drive shaft and generally parallel to the mandrel shaft at the coiling station directing wire to the mandrel in a preselected pattern, means on the frame driving said wire directing means simultaneously and in preselected relation with the mandrel shaft, wire feed means delivering wire to the wire directing means and mandrel at the coiling station, wire gripper means on each mandrel, wire inserting means on the frame spaced from the mandrel drive shaft and movable radially thereof to insert a wire into the wire gripping means, severing means on said wire gripping and wire inserting means severing wire at the gripping means, first sensing means on the frame actuated by the arm indexing means energizing successively said wire inserting and severing means and said second drive means when an arm is indexed at the coiling station, second sensing means on said frame sensing the diameter of a coil of wire on the mandrel being rotated and successively deenergizing said second drive means when a coil of pre-selected size has been made, releasing said indexing arm and energizing said first drive means to rotate the main shaft and arms, mandrel indexing means on each arm, means on the frame in the path of rotation of the mandrel rotating a filled mandrel to a preselected index position and coil removing means on the frame spaced from the mandrel drive shaft and defining an unloading station, said coil removing means compressing the mandrel, releasing the wire gripping means and removing a filled coil from the compressed mandrel each time the arm indexing means indexes a mandrel at the coiling station.

---

## 4,147,311
## TAPE/CAPSTAN FEED UNIT

**Kenneth A. Jordan, Oadby, United Kingdom, assignor to Trip Lite Ltd., South Wigston, United Kingdom**

**Continuation-in-part of Ser. No. 700,039, Jun. 25, 1976, abandoned. This application Dec. 1, 1977, Ser. No. 856,230**
**Claims priority, application United Kingdom, Aug. 15, 1975, 34161/75**
**Int. Cl.² B65H** *51/20, 51/26*
**U.S. Cl. 242—47.01** **5 Claims**



1. A method of feeding yarn to textile machinery selectively under conditions of positive feed or at a rate dictated by demand from the said machinery, comprising the steps of:

(1) winding a number of turns of said yarn in a yarn path extending around a feed wheel and a smooth straight-sided upstanding member that is positioned alongside said feed wheel and inclined to the rotary axis of said feed wheel;

(2) driving said feed wheel by frictional contact with a flexible tape contacting a small arc of said feed wheel over only a part of the axial width of said feed wheel; and

(3) selectively guiding the yarn turns to two distinct axial zones on said feed wheel, while maintaining axial spacing of said yarn turns, one such axial zone being a zone in which said yarn passes repeatedly on successive turns through the nip formed between said flexible tape and said feed wheel to achieve positive feed of said yarn, the other axial zone being a zone in which said yarn does not pass through said nip so as to achieve yarn feeding at a rate dictated by demand from the said machinery, and movement of the yarn turns from either axial zone to the other being accompanied by free and unobstructed re-positioning of the successive turns of yarn on said upstanding member.

---

## 4,147,312
## GAS-LIQUID HYDRAULIC EXPANDABLE CHUCKS AND SHAFTS

**Arthur D. Secor, and Jerome G. Secor, both of Toledo, Ohio, assignors to Great Lakes Industries, Inc., Toledo, Ohio**

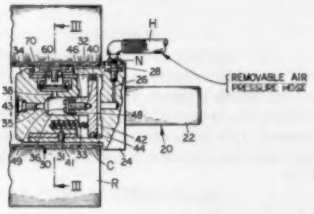
**Filed Sep. 22, 1977, Ser. No. 835,586**
**Int. Cl.² B65H** *75/24*
**U.S. Cl. 242—72 R** **42 Claims**

22. An expandable mandrel comprising a rotatable shaft means having a self-contained gas and closed liquid hydraulic system comprising:

(A) a gas cylinder having a valved inlet,

(B) a liquid cylinder having a smaller cross-sectional area than said gas cylinder,

(C) a single piston means reciprocal in both said cylinders,
(D) check valve means in said inlet for gas to said gas cylinder for connection of a pressure source when said shaft is stationary,
(E) a plurality of radially extending rams surrounding said mandrel, and
(F) liquid duct means from said liquid cylinder to said rams,




whereby gas pressure applied to said check valve means moves said piston to apply an increased pressure to the liquid in said liquid cylinder to move said rams radially outwardly to grip a hollow cylindrical object into which said mandrel is positioned and to maintain the liquid pressure for said grip by the compressed gas in said gas cylinder until the pressure of said gas is released by operation of said check valve means.

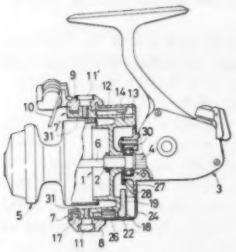
---

**4,147,313**

## BAIL LATCHING AND RELEASING MECHANISM FOR SPIN FISHING REEL

**Kounin Sazaki, Fukuyama, Japan, assignor to Ryobi Ltd., Hiroshima, Japan**

**Filed Feb. 6, 1978, Ser. No. 875,662**
**Claims priority, application Japan, Feb. 18, 1977, 52/19369[U]**
**Int. Cl.[2] A01K *89/01***
**U.S. Cl. 242—84.2 G** **4 Claims**



1. A bail arm latching and releasing mechanism for spinning reel, which includes a bail arm pivotally mounted at both ends on diametrically opposite sides of a rotor for swinging movement thereacross between cocked and rewind position, a kick lever, a pivot cam mounted on one end of the bail arm, a lever member mounted on the other end of the bail arm, the kick lever and the pivot cam being slidably and pivotally mounted respectively on a support housing of the rotor, a coil spring biasing the kick lever toward the pivot cam and into engagement therewith characterized by

(a) the kick lever **18** having a L-shaped configuration including a radially extending upright portion **19**,
(b) a bail arm turn spring **14** secured at one end to the lever member **9** and at the other end to the support housing **7'** to bias the bail arm **10** toward cocked and rewind positions, the spring having a dead point between bail arm cocked and rewind positions, the biasing force of the spring **14** being larger than the coil spring **26**,
(c) the pivot cam **8** having a first boss **16** to selectively hold the bail arm **10** in the cocked position and having a second boss **17** to urge the kick lever **18** against the biasing force of the coil spring **26**, the second boss **17** being engaged with a projection **15** provided on the support housing **7** of the rotor **1** to hold the bail arm **10** in its rewind position, the first boss **16** being engaged with the kick lever **18** to prevent rearward movement thereof when the second boss **17** is engaged with the projection **15**, and
(d) a key plate **27** mounted to the reel body **3** and disposed in the rotational path of the upright portion **19** of the kick lever **18** when the bail arm **10** is in cocked position.

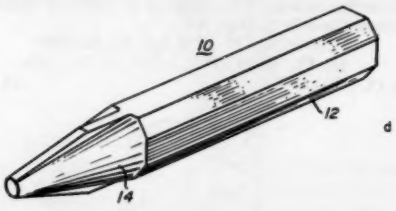
---

**4,147,314**

## WINDING TOOL FOR MAGNETIC TAPE CASSETTES

**David E. Traulsen, 150 Cypress La., Watsonville, Calif. 95076**

**Filed Dec. 14, 1977, Ser. No. 860,396**
**Int. Cl.[2] G11B *15/42***
**U.S. Cl. 242—179** **4 Claims**




1. A winding tool for engaging the sprocket portion of a tape cassette reel comprising:

an elongated body forming a handle portion and a blade portion, said blade portion including two diametrically opposed keys having a width dimension to fit in the space between two adjacent sprocket teeth;
said blade portion having a circular cross section between said keys which tapers from the dimension of said handle portion to a smaller circular end surface, with the dimension of the circular cross section of the midpoint of said blade portion being selected for substantial half-way insertion into the sprocket portion; and
said keys having a height dimension selected to be substantially equal to the sprocket tooth height at half-way insertion of said blade portion into the sprocket portion, and being tapered to zero height at said smaller circular end surface.

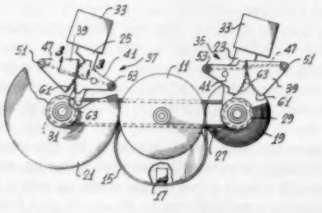
---

**4,147,315**

## TAPE TRANSPORT APPARATUS

**Roger S. Kincel, Whittier, Calif., assignor to BASF Aktiengesellschaft, Rheinland-Pfalz, Fed. Rep. of Germany**

**Filed Nov. 17, 1977, Ser. No. 852,330**
**Int. Cl.[2] G03B *1/04*; G11B *15/32***
**U.S. Cl. 242—192** **19 Claims**



1. In a tape transport apparatus having a chassis, a drive capstan and a pair of tape reels journaled on carriages and moved into surface engagement with the capstan, to drive the tape from one reel to the other, the improvement comprising:

pivotal mounting means for pivotally securing each of the

carriages to the chassis, said pivotal mounting means including

a base block secured to said chassis, said base block having a first rocking surface,

a rocker block secured to the corresponding carriage, said rocker block having a second rocking surface, and

coupling means for urging the first and second rocking surfaces into engagement with each other, whereby said rocker block can pivotally rock on said base block, and the instantaneous pivot points for the carriages are moved automatically to compensate for changes in mass of the tape reels as tape is moved from one of the reels to the other; and

counterweighting means associated with each carriage for providing a center of mass of the carriage, the corresponding tape reel and counterweighting means substantially at said pivotal mounting means, thereby minimizing net rotational forces about said pivotal mounting means due to shock or vibration, and minimizing the effects of shock and vibration forces on the degree of surface engagement of the reels with the capstan.

---

**4,147,316**

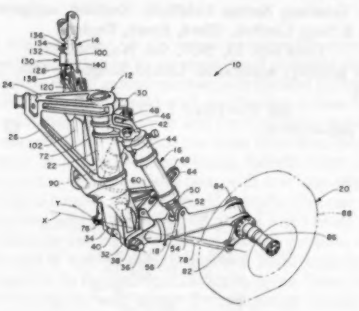
## AIRCRAFT LANDING GEAR ASSEMBLY

**Giles A. Kendall, Burbank, and Robert Minick, Paso Robles, both of Calif., assignors to Menasco Manufacturing Company, Burbank, Calif.**

**Filed Aug. 12, 1977, Ser. No. 823,923**

**Int. Cl.[2] B64C *25/18***

**U.S. Cl. 244—102 R** **11 Claims**



1. A collapsible aircraft landing gear assembly movable between a retracted position and an extended position, said landing gear assembly comprising:

a strut leg assembly comprised of a solid, elongated member having an upper end and a lower end, said upper end adapted to be pivotly mounted to the aircraft;

a wheel lever assembly having a first end and a second end, said first end being pivotly connected to said lower end of said strut leg assembly establishing a first pivot axis;

a tire supporting axle attached to a short axle, the longitudinal center axis of said tire supporting axle being angularly disposed to the longitudinal center axis of said short axle, said short axle being pivotly mounted on said second end of said wheel lever assembly, means for pivoting said short axle relative to said wheel lever assembly thereby causing said tire supporting axle to be located in different angular positions relative to said wheel lever assembly;

a shock absorber assembly interconnecting said wheel lever assembly and said strut leg assembly;

a side brace assembly, one end of which is pivotly connected to said strut leg assembly and the other end of which is adapted to be pivotly connected to the aircraft; and

with said landing gear assembly in said extended position said wheel lever assembly to reciprocally pivot relative to said strut leg assembly thereby causing said tire supporting axle to oscillate relative to said strut leg assembly, means for maintaining said longitudinal center axis of said tire supporting axle parallel during the oscillation of said tire supporting axle.

---

**4,147,317**

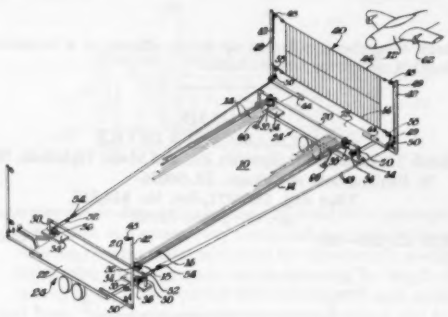
## MOBILE RPV LANDING DECK

**Harry E. Mayhew, Wilmington, and Harry W. De Shay, Rambleton Acres, both of Del., assignors to All American Industries, Inc., Thomaston, Conn.**

**Filed Jun. 23, 1977, Ser. No. 809,478**

**Int. Cl.[2] B64F *1/02***

**U.S. Cl. 244—116** **14 Claims**



1. A mobile RPV landing deck comprising a pair of over-the-road trailers for disposition with their longitudinal axes parallel to each other with a distance between them substantially equal to the length of the deck, a plurality of somewhat elastic longitudinal stringers disposed substantially perpendicular to the longitudinal axes of the trailers, longitudinal anchor means on each of the trailers for supporting the elastic stringers deployed between the trailers in a spaced parallel disposition, detachable connecting means on the ends of the stringers for attaching them to the trailers whereby the stringers are deployed parallel and a short distance from each other to form an elastic deck between the trailers for receiving an arrested RPV dropped down upon the deck, the detachable connecting means being constructed and arranged for rapid and convenient detachment of the stringers to at least one of the trailers whereby the stringers may be rapidly disconnected from at least one of the trailers and stored upon at least one of the trailers whereby the deck may be rapidly and conveniently moved together with the trailers from one location to another, an aircraft-arresting means is connected to at least one of the trailers, an energy absorber is mounted on at least one of the trailers including a linear payout element, and linear means connects the aircraft-arresting means to the linear payout element.

---

**4,147,318**

## ENGINE CASING SUPPORT BRACKET

**Angus McDonald, Johannesburg, South Africa, assignor to Alan Morris Buten, Johannesburg, South Africa**

**Filed Mar. 23, 1977, Ser. No. 780,338**

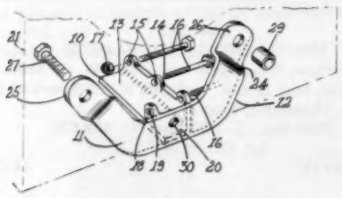
**Claims priority, application South Africa, Apr. 7, 1976, 76/2094**

**Int. Cl.[2] B60K *1/00***

**U.S. Cl. 180—64 R** **11 Claims**

9. A bracket for supporting an internal combustion engine on a chassis wherein the bracket includes an arm to be affixed to the casing of an engine such casing being defined by two half sections, the sections being affixed together by bolt-like means passing through apertures in the engine casing substantially along the longitudinal line defined between the front and back of the engine, the arm providing apertures to mate with the apertures in the casing and the arm being affixed to the casing by bolt means passing through such apertures and the mating

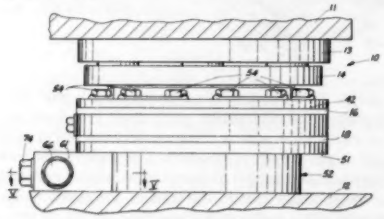
apertures in the two half sections, the arm providing at its one end a wing extending transversely to either side of the arm,



each wing being adapted to being affixed to a transverse bracket connected to the chassis.

---

**4,147,319**
**SHOCK ABSORBER DEVICE**
**Isaak Tsybulnik, 6830 Sheridan Rd., and Maikl Tsybulnik, 7008 N. Paulina, both of Chicago, Ill. 60626**
**Filed Aug. 15, 1977, Ser. No. 824,812**
**Int. Cl.[2] F16M *13/00***
**U.S. Cl. 248—582** **7 Claims**

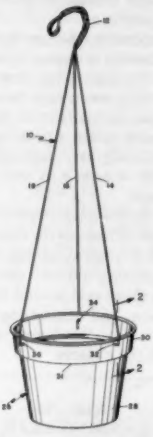


1. In a device for supporting a machine or the like from a support surface, compressible fluid chamber means arranged for disposition on the support surface and defining a chamber for receiving a compressible fluid, said fluid chamber means including flexible diaphragm means defining an upper wall portion thereof, coupling means for transmitting forces from the machine to said diaphragm means, means for injecting a compressible fluid into said compressible fluid chamber to develop a certain static pressure therein, said coupling means comprising a piston element arranged to be coupled to the machine and means defining a closed liquid chamber for transmission of pressure from said piston element to said diaphragm means, and second diaphragm means engaged by said piston element and cooperating with the first diaphragm means in defining said liquid chamber.

---

**4,147,320**
**POT HANGER**
**Lawrence W. Biedebach, 2225 Primrose St., Vista, Calif. 92083**
**Filed Aug. 24, 1977, Ser. No. 824,511**
**Int. Cl.[2] A47G *7/00***
**U.S. Cl. 248—318** **2 Claims**

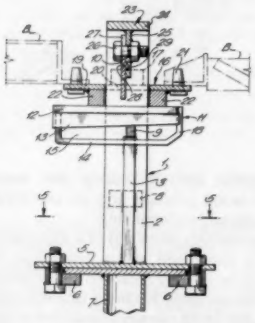
1. A pot hanger in combination with a flower pot;
said pot hanger comprising a plurality of strand of high tensile wire secured together and forming a hook portion and at least three tines extending outward from said hook portion, and a generally Z-shaped hook member formed on the end of each of said tines for cooperatively engaging bores in the wall of a container for supporting the container, said hook members are each defined by a first portion that extends at substantially a right angle to said tine and a second portion that extends substantially parallel to said tine in a direction away from the tine;
said pot having a generally cylindrical open top configuration defined by a generally annular vertically extending wall, a plurality of horizontal bores in said wall adjacent the open top for receiving said hook means, so that said first portion of said hook means extends through said



bores and said second portion engage the inside of said wall for retaining said hook means in position in said bore.

---

**4,147,321**
**DROP-HEAD SUPPORT ASSEMBLY**
**Peter E. Gostling, Sutton Coldfield, England, assignor to C. Evans & Sons Limited, Ilford, Essex, England**
**Filed Sep. 23, 1977, Ser. No. 835,858**
**Claims priority, application United Kingdom, Oct. 7, 1976, 41724/76**
**Int. Cl.[2] E04G *17/00, 25/00***
**U.S. Cl. 248—354 R** **13 Claims**



1. A drop-head support assembly comprising an upright pillar having upper and lower end portions, means for forming a space between said end portions along a length of said pillar, said upper end portion being adapted to receive a detachable head plate device, said lower end portion being adapted for attachment to a scaffold or the like, a shuttering support member between said upper and lower end portions, means mounting said support member for sliding movement along said pillar between a raised operative position and a lowered inoperative position, wedge means captively mounted on said pillar for locking said support member in its raised operative position, said wedge means including a wedge device having an elongated tapered part, a slot extending lengthwise of said tapered portion, a pin passed through said slot transversely of said space and fixed to said pillar whereby said wedge device is pivotally attached to said pillar and is angularly movable rela-

tive thereto in a vertical direction between an operative position extending transverse to the longitudinal axis of said pillar to lock said support member in its raised operative position and an inoperative position at which said wedge device is co-extensive with the longitudinal axis of said pillar, and said space being of a size to accommodate said wedge device in its inoperative position to permit movement therepast of said support member from the latter's operative position to its inoperative position.

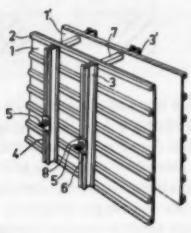
---

**4,147,322**

## MOLD ELEMENT FOR CONCRETE-CASTING

**Claes-Inge S. Dahlström, Patron Lars väg 18, S-121 40 Huddinge, Sweden**

**Filed Sep. 19, 1977, Ser. No. 835,357**
**Claims priority, application Sweden, Sep. 24, 1976, 7610641**
**Int. Cl.[2] E04G *11/08***
**U.S. Cl. 249—40** **7 Claims**



1. A mold element for casting concrete walls comprising a mold wall strengthened by an assembly of elongate strengthening members which extend substantially parallel to one another and to one edge of the mold wall, and having at least two mold beams extending transverse to said strengthening members and across the mold wall from said one edge thereof to the opposite edge, each of the mold beams being upright when the mold element is in a vertical orientation, with said one edge uppermost to form a mold, and each mold beam having one and only one coupling hole extending through the mold beam at which a stay member can be positioned to extend between the mold element and a corresponding opposed mold element to link them together to form a mold cavity between them, these stay members being the only means for restraining outward movement of the mold elements, said coupling hole being located at a position corresponding to 1/3 to forty percent of the length of the beam from the lower end thereof and a distance member arranged at the uppermost edge of the mold wall opposite each beam to engage the uppermost edge of the corresponding mold wall opposite a corresponding beam of an opposed mold element to prevent bending of the beams towards one another in the course of casting, but not preventing movement of the upper ends away from one another.

---

**4,147,323**

## CONCRETE FORMING AND CURING APPARATUS

**David P. Welden, N. Indiana Ave., Iowa Falls, Iowa 50126**

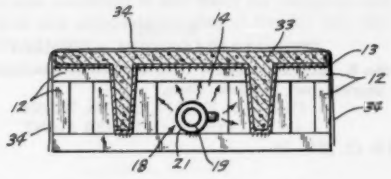
**Filed Aug. 26, 1977, Ser. No. 827,888**
**Int. Cl.[2] B28B *7/00***
**U.S. Cl. 249—79** **4 Claims**

1. Apparatus for curing concrete including a frame, a mold disposed on said frame for receiving concrete in a moldable condition, an opening disposed under said mold, a heat distributing means disposed in said opening for evenly distributing heat to said mold, heater means attached to said heat distributing means for supplying heat to said heat distributing means, circulating means for causing heat from said heater means to flow to said heat distributing means, said heat distributing means comprising:

a first rigid conduit, said first conduit being attached at one end thereof to and in communication with said heater means, said first conduit having sidewalls impervious to the flow of gases, the other end of said first conduit being open;

a second rigid conduit sealingly disposed around said first conduit and encompassing said other end of said first conduit;

passageway means formed between said first and said second conduits, said other end of said first conduit being in fluid communication with said passageway means whereby heated gases from said heater means pass through said first conduit and out the other end thereof into said passageway means;



aperture means disposed in said second conduit in communication with said passageway means and in communication with the opening under said mold for substantially evenly distributing heated gases to said mold along the length of said mold for evenly curing the concrete with said mold;

said heater means comprising a heater for burning fuel for producing heat and by-products of combustion, said circulation means adapted to force heated air and by-products of combustion from said heater means to said first conduit whereby heat is not lost through a stack for venting out by-products of combustion.

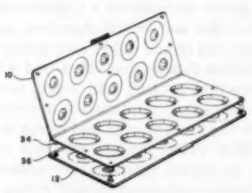
---

**4,147,324**

## SHOTGUN TARGET MOLD FOR ICE TARGETS

**Dennis P. Walter, Box 284, Paxtonville, Pa. 17861**

**Filed Sep. 9, 1977, Ser. No. 831,738**
**Int. Cl.[2] F25C *1/22*; B29C *1/00***
**U.S. Cl. 249—170** **1 Claim**



1. A shotgun target mold, comprising:

a mold for a target, with

the mold made of mating sections connected together, wherein a portion of water may be insertable in the mold, and a portion of ice removeable from a mold after a freezing of the postion of water into ice, wherein

said mating sections comprise an upper section of the mold and a lower section of the mold, which said upper section and said lower section are hingeably connected together, with a portion of said lower section shaped with a recessed frustrum-shaped mold cavity extending from the interior surface of the said lower section which abuts the interior surface of said upper section when the said mating sections are hinged in the closed position of the mold, and with said upper section shaped with a projecting section extending from the interior surface of the upper section that is located to extend into the said cavity of the lower section in said closed position of the mold, wherein

one of the sections of the mold has a barbed stud attached to

an interior surface of the section, and the other section of the mold has a stud holding aperture in the mold engageable with the barbed stud, whereby the mold may be held in a closed configuration, and further comprising

stackable means for engaging the mold with a second mold, wherein

the said stackable means is a female ferrule attached to an outer surface of one of the mold sections, and a male ferrule attached to an outer surface of the other surface of the mold with said female and male ferrules each shaped so as to be engageable with a similar male or female ferrule respectively attached to an adjacent mold of similar shape.

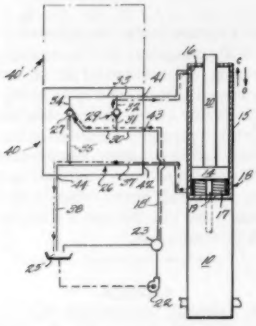
---

**4,147,325**

## HYDRAULIC CONTROL ASSEMBLY

**John K. McGee, Houston, Tex., assignor to Combustion Engineering, Inc., Windsor, Conn.**

**Filed Mar. 29, 1977, Ser. No. 782,508**
**Int. Cl.[2] F16K *31/143*; F15B *13/042***
**U.S. Cl. 251—25** **10 Claims**



1. A fail-safe valve operator assembly comprising

(a) a fail-safe valve,

(b) means for opening and closing said fail safe valve, comprising a piston movable in a cylinder and dividing the cylinder into first and second chambers, said piston operatively connected to said valve, said piston when moved in a first direction closing said valve, and when moved in a second direction opening said valve, said first chamber having a maximum displaceable volume which is exhausted during movement of said piston in said first direction to effect valve closing, and said second chamber having a maximum displaceable volume which is exhausted during movement of said piston in said second direction to effect valve opening,

(c) means for moving said piston in said first and second directions, said means comprising (i) means for biasing said piston in said first direction for rapid movement in said first direction comprising a coil spring disposed in said second chamber abutting said piston, and (ii) fluid means, and

(d) said fluid means comprising (i) means defining said piston cylinder so that the maximum displaceable volume of the first cylinder chamber, which is exhausted during movement of said piston in said first direction to effect valve closing, is equal to or less than the maximum displaceable volume of the second cylinder chamber which is exhausted during movement of said piston in said second direction to effect valve opening, (ii) a high-pressure source of fluid for supplying fluid to said cylinder to move said piston in said second direction, (iii) a fluid reservoir, and (iv) means for valving said fluid to effect movement of said piston in said first direction upon termination of the flow of fluid from said high-pressure source without leakage of fluid from the assembly, and to effect movement of said piston in said second direction responsive to said high-pressure fluid source.

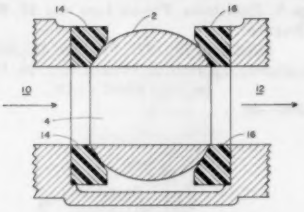
---

**4,147,326**

## NON-SPHERICAL BALL VALVE

**Angelo Natalizia, Smithfield, R.I., assignor to International Telephone & Telegraph Corp., Nutley, N.J.**

**Continuation of Ser. No. 593,098, Jul. 3, 1975, abandoned. This application Jan. 19, 1978, Ser. No. 870,686**
**Int. Cl.[2] F16K *5/06***
**U.S. Cl. 251—162** **9 Claims**



1. A ball and seat assembly for use in a top entry ball valve of the type that includes a housing having opposed inlet and outlet ports and seat engaging surfaces surrounding said ports, said ball and seat assembly, comprising:

a ball member having an internal bore therethrough forming inlet and outlet openings, said ball member having an outer spherical surface region merging into contiguous relieved outer chamfered surface regions, said relieved outer chamfered surface regions surrounding the peripheries of said inlet and outlet openings;

a first valve seat having a ball engaging surface and a housing engaging surface, said seat adapted to be disposed between the seat engaging surface surrounding the inlet port and said ball member; and

a second valve seat having a ball engaging surface and a housing engaging surface, said seat adapted to be disposed between the seat engaging surface surrounding the outlet port and said ball member, the ball member and valve seats being of a size so that when the ball member and valve seats are assembled with the ball engaging surfaces of the valve seats engaging the relieved outer chamfered surface regions of the ball member, the assembly may be slidably received with substantially no restraint between the seat engaging surfaces of the housing, whereby the valve seats hold the ball member in place within the housing by merely engaging the seat engaging surfaces of the housing and said relieved outer chamfered surface regions of the ball when the ball member is disposed in an open position with the bore in communication with the housing ports and the outer spherical surface region of the ball member sealingly compresses the valve seats when the ball member is disposed in a closed position with the outer spherical surface of the ball member engaging the ball engaging surfaces of the seats.

---

**4,147,327**

## METALLIC SEALS FOR BALL VALVE

**George A. Moran, Houston, Tex., assignor to ACF Industries, Incorporated, New York, N.Y.**

**Filed Jun. 16, 1977, Ser. No. 807,281**
**Int. Cl.[2] F16K *5/06***
**U.S. Cl. 251—174** **8 Claims**

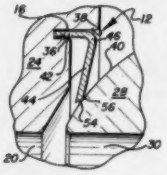
1. A ball valve, comprising:

(a) a valve body having inlet and outlet flow passageways and a valve chamber therebetween, a ball member having a passage therethrough mounted in said valve chamber for rotation between open and closed positions;

(b) said valve chamber being located at the juncture of said flow passageways and having opposed end walls extend-

ing generally radially outward from said passageways, each of said end walls having an annular groove therein extending in general axial alignment with the longitudinal axis of said passageways, said groove being defined by a pair of parallel sides coaxial with the passageways and a bottom extending between the parallel sides in a perpendicular relation thereto; and

(c) sealing means mounted in the grooves including a deformable annular metallic seal ring around each of said inlet and outlet passageways to form upstream and downstream seal rings, said seal rings each being of a generally right angled cross-section when in a free position and




forming a leg portion and a free lip portion, said free lip portion extending generally transversely to the longitudinal axis of the flow passageways and having a relatively sharp inner annular edge portion contacting said ball member, said leg portion extending in general axial alignment with said passageways and anchored within the associated groove to secure said seal ring in position, said lip portion being resiliently deformed to a generally frusto-conical shape relative to the leg portion upon contact with said ball member in a preloaded position upon assembly of said valve with said sharp annular edge portion being in sealing engagement with said ball member.

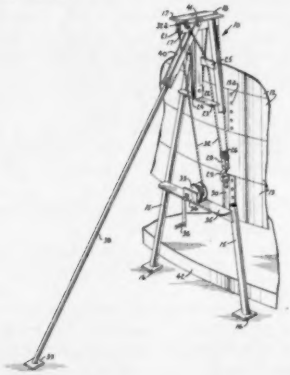
---

**4,147,328**

## MULTIPLE PULLEY BIN JACK

**E. Glenn Sprigg, Blackwater, Mo. 65322; Everett O. Couch, Box 146, Nelson, Mo. 65347, and Shelby D. Hendrix, Blackwater, Mo. 65322**

**Filed Feb. 27, 1978, Ser. No. 881,352**
**Int. Cl.[2] B66F 7/12**
**U.S. Cl. 254—89 R** **4 Claims**



1. A jack comprising:

an upright tripod frame including an A-shaped portion forming the front of said frame and further including a brace leg extending to the rear thereof with a pin connected to the upper end of said frame to permit limited pivotal movement of said brace leg;

a flexible cable having a fixed end secured to said frame to the rear of said pin of the brace leg;

a floating pulley receiving said cable and supported thereby for generally up and down movement in response to taking up and paying out of said cable;

load coupling means carried by said floating pulley for coupling to a load for the raising or lowering thereof in response to the raising or lowering of the floating pulley;

a first fixed pulley mounted on said frame at a location generally above said floating pulley to receive said cable;

a second fixed pulley mounted on said frame at a location generally above said floating pulley and to the rear of said pin of the brace leg to receive said cable;

take up means connected to said frame for taking up said cable from said second fixed pulley to thereby raise said floating pulley.

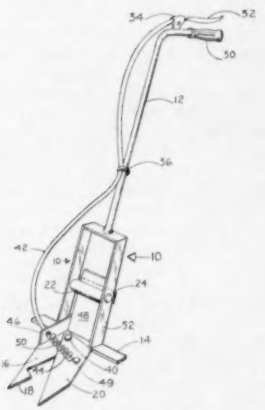
---

**4,147,329**

## WEED PLUCKER

**Victor N. Rodriguez, 5712 E. 12th St., Tucson, Ariz. 85711**

**Filed Apr. 24, 1978, Ser. No. 899,568**
**Int. Cl.[2] B66F 3/00**
**U.S. Cl. 254—132** **5 Claims**



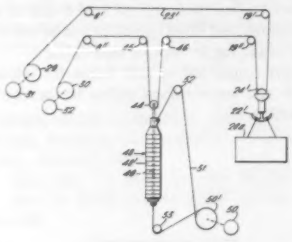

1. Apparatus to extract plants and weeds from the ground comprising plant stem engaging and holding means having a first and second blade means operably connected to open and close in scissors-like fashion, said first blade means defining hook-shaped plate means adapted to overlap said second blade means to define a triangle shaped opening between said blades, both said blade means adapted to surround and engage the plant stem to be extracted; fulcrum means operably attached to said plant stem engaging and holding means, said fulcrum means adapted to rest upon the ground; and lever means attached to said fulcrum means whereby when said blade means opens and closes in scissors-like fashion, a narrowing closed triangular shaped opening between the blades is created to hold the plant stem in order that the plant may be levered out of the ground by rotating the lever handle means about the fulcrum means.

4,147,330

## METHOD FOR SETTING DOWN OR TAKING UP A LOAD FROM OR UPON A LOADING LOCATION BY MEANS OF A CRANE AND AN APPARATUS FOR CARRYING OUT THE METHOD

Geir Eik, Ski, Norway, assignor to A/S NorMar, Oslo, Norway

Filed Aug. 16, 1977, Ser. No. 825,102
Claims priority, application Norway, Aug. 20, 1976, 762888
Int. Cl.[2] B66D *1/48*
U.S. Cl. 254—173 R 9 Claims



1. In a method for putting down or taking up a load from or upon a loading location by means of a crane, wherein the crane or the loading location is subjected to substantially irregular vertical movements which change the distance between the hoisting hook of the crane and the loading location, and wherein there is accomplished a preferably continuous measuring of units which give information about distance and relative velocity between a point on the crane and the loading location and treating and possibly converting the measuring signals so as to create regulating signals which impart to the hoisting hook an acceleration or retardation as a compensation for the irregular movements, so that the relative movement between the load and the loading location will follow the course desired by the operator, without undesired powerful collisions between the load and the loading location, and wherein the measuring signals are supplied to a device which affects the depending cable length of the hoisting cable independently of the hoisting machinery thereof, the improvement comprising the steps of providing at least one adjustable gravity influenced weight means for regulating the depending length of the hoisting cable, connecting said weight means, maintaining said weight means during normal conditions in an intermediate position and thereafter moving said weight means out of said intermediate position to shorten or lengthen the hoisting cable.

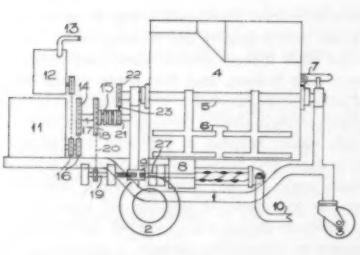
---

4,147,331

## PLASTER SPRAYING AND CONCRETE MIXING MACHINE

Eugene F. Kopecky, 5959 Madra Ave., San Diego, Calif. 92120

Filed Sep. 12, 1975, Ser. No. 612,676
Int. Cl.[2] B28C *5/14*
U.S. Cl. 366—46 4 Claims



1. A mixing and spraying machine, said machine comprising:
a frame,
a mixing tank pivotally mounted on said frame for selectively pivoting about a horizontal axis between an upright position and a dumping position,
rotatable mixing means mounted within said tank for rotation relative to said mixing tank about said horizontal axis,
a gravity fed progressive cavity pump mounted directly on the underside of said mixing tank for pumping material directly from said tank,
a prime mover, and
drive means for connecting said prime mover for driving said rotatable mixing means and for driving said pump, said drive means being connected to said mixing means and to said pump means so that said pump is free to pivot with said mixing tank between said mixing position and said dumping position.

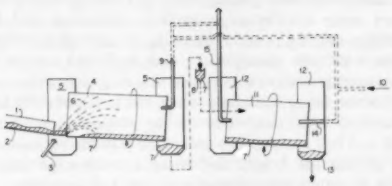
---

4,147,332

## METHOD FOR RECOVERING HEAT FROM MOLTEN SLAG AND AN APPARATUS THEREFOR

Ishii Kotaro; Mitsutsuka Masahiko, and Osada Tomoyuki, all of Shibatashi, Japan, assignors to Pacific Metals Co., Ltd., Japan

Filed Aug. 5, 1977, Ser. No. 822,338
Claims priority, application Japan, Aug. 5, 1976, 51-092789
Int. Cl.[2] C21B *3/06*
U.S. Cl. 266—44 11 Claims



1. A method for recovering heat from a molten slag which comprises atomizing the molten slag flowing down from an end of a slag trough for discharging the molten slag from a metallurgical furnace by means of air jet into a primary heat-exchanger of rotary cylindrical type passing hot slag granules thus atomized through the primary heat-exchanger in a co-current of air to effect heat-exchange with the air and to obtain a primary hot air blast, introducing the hot slag granules discharged from the primary heat-exchanger in and through a secondary heat-exchanger connected to the primary heat-exchanger in a counter current of cool air supplied from outside the heat-exchanger to effect heat exchange to obtain a secondary hot air blast.

---

4,147,333

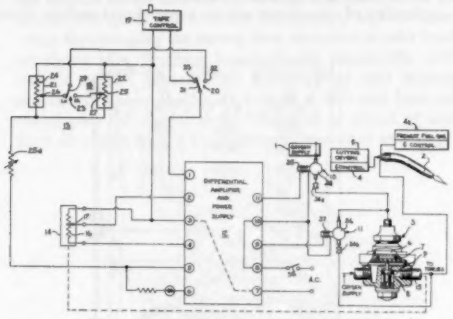
## PROGRAMMED PRESSURE REGULATOR FOR CONTROLLING THE SUPPLY OF GAS PRESSURE TO A LOAD DEVICE

Jon C. Wirth, Mequon, Wis., assignor to Heath Engineering Company, Fort Collins, Colo.

Filed Apr. 26, 1977, Ser. No. 791,047
Int. Cl.[2] B23K *37/00*
U.S. Cl. 266—48 6 Claims

1. A flame cutting apparatus having a torch means, comprising a gas supply means for supplying gas to said torch means, a dome valve regulator having an input chamber and a valved chamber including a valve operator for opening and closing a valve unit in said valved chamber and said operator including a moving wall of said input chamber and operable to fully open or close said supply valve unit, said valved chamber having an inlet port connected to the gas supply means and an outlet port connected to the torch means, a solenoid supply valve connecting said supply means to said input chamber, said supply valve having an orifice connected in series to said input chamber, a solenoid bleed valve connecting said input chamber to

the outlet side of the valved chamber, a pressure transducer coupled to the outlet side of the valved chamber and developing a signal proportional to the output pressure of the gas supplied to the torch means, a reference signal source, a differential amplifier having a pair of inputs connected to said transducer and said reference signal source and having a first signal output at a selected level above said references and a second signal output at a selected level below said reference and defining a deadband range between said selected reference levels to



selectively turn both said solenoid valves off in said deadband range and to oppositely turn said solenoid valves fully on and off outside said deadband range and thereby oppositely open and close said supply valve and said bleed valve, said reference signal means includes a plurality of signal sources, said plurality of signal sources includes a programmed signal source and a plurality of manually presettable signal sources, and a switch means for selectively connecting said signal sources to said amplifier.

---

**4,147,334**

## METHOD AND APPARATUS OF PRODUCING IRON

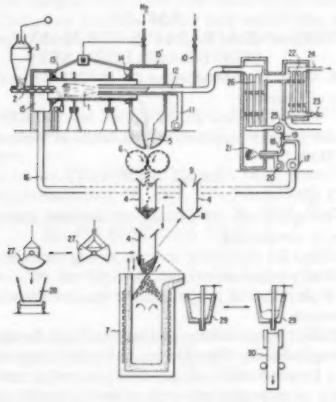
**Robert Lafont, Gif sur Yvette, and Louis H. Hallot, Gagny, both of France, assignors to Regie Nationale des Usines Renault, Boulogne-Billancourt, France**

**Division of Ser. No. 760,819, Jan. 19, 1977. This application Jan. 5, 1978, Ser. No. 867,346**

**Claims priority, application France, Jan. 20, 1976, 76 01333**

**Int. Cl.[2] C21B *1/16***

**U.S. Cl. 266—89** **1 Claim**



1. An apparatus for producing iron by direct reduction of ore, compaction into agglomerates and fusion of the reduced ore, comprising:

a rotary kiln;

means for introducing a powdered enriched ore into said rotary kiln at one end thereof;

burner means disposed within said rotary kiln adjacent the other end thereof for maintaining two temperature zones within said rotary kiln, that near said one end thereof being at about 1000° C. and that nearest said other end thereof being at about 700° C., said burner means comprising at least three concentric pipes arranged with the open ends thereof facing said one end of said rotary kiln, the outer pipe of said concentric pipes being connected to one of a supply and a combustible gas, the central pipe of the concentric pipes being connected to a recuperator for reintroducing into said rotary kiln the kiln gases recycled and reheated by said recuperator, and the middle pipe of said concentric pipes being connected to the other of said supply gas and said combustible gas for introduction into said rotary kiln;

means for adding hydrogen to the 700° temperature zone in said rotary kiln, and differential manometer means connected to said one end and said other end of said rotary kiln for the purpose of regulating the feeding of said hydrogen to said rotary kiln on the basis of balancing of the pressures in the two temperature zones;

means for receiving the resultant powder from said other end of said rotary kiln and for compacting the same in an agglomerate state;

an induction furnace;

substantially closed container means for transferring said compacted agglomerate from said receiving means to said induction furnace and mixing therewith a preexisting charge of liquid metal; and

means for skimming off the slag of such product from said induction furnace and for pouring said melted charge into a continuous casting installation.

---

**4,147,335**

## APPARATUS FOR HARDENING THE CAM TRACKS OF CAMSHAFTS FOR INTERNAL COMBUSTION ENGINES

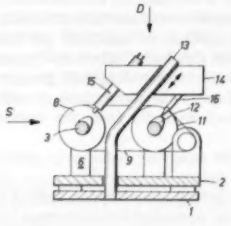
**Klaus Heck, Ingolstadt, Fed. Rep. of Germany, assignor to Audi-Nsu Auto Union Aktiengesellschaft Neckarsulm, Neckarsulm, Fed. Rep. of Germany**

**Filed Jan. 27, 1978, Ser. No. 873,428**

**Claims priority, application Fed. Rep. of Germany, Jan. 28, 1977, 2703469**

**Int. Cl.[2] C21D *1/08***

**U.S. Cl. 266—261** **10 Claims**



1. An apparatus for hardening, without quenching, the cam tracks of a camshaft for internal combustion engines comprising:

a frame;

means mounted on said frame for mounting for rotation a camshaft to be hardened;

a master camshaft having at least one cam track of substantially the same shape and orientation as the cam track of said camshaft to be hardened;

means for mounting for rotation adjacent to said camshaft to be hardened said master camshaft;

means for synchronously rotating said camshaft to be hardened and said master camshaft;

at least one arc-remelting burner for heating a corresponding cam track of said camshaft to be hardened;

means, connected to said at least one burner and responsive to the rotational orientation of said master camshaft, for mounting said at least one burner for movement toward and away from said corresponding cam track such that at all times said at least one burner is maintained at a uniform distance from the surface of said corresponding cam track;

means for moving said camshaft rotational mounting means axially of said at least one camshaft to be hardened such that during rotation of said camshafts, said camshaft to be hardened oscillates axially with an amplitude substantially equal to the width of said corresponding cam tracks and with a frequency which may be tuned relatively to the angular rotational velocity of the camshafts in conformity with the physical dimensions and performance criteria of the camshaft to be hardened.

---

**4,147,336**

## SEAT FRAME FOR A VEHICLE

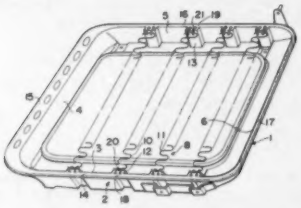
**Takeshi Yamawaki, Okazaki, and Hirofumi Kume, Toyota, both of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan**

**Filed Nov. 7, 1977, Ser. No. 849,331**

**Claims priority, application Japan, Dec. 20, 1976, 51-153726**

**Int. Cl.[2] F16F *3/02***

**U.S. Cl. 267—111** **11 Claims**



1. A seat frame for a vehicle, said seat frame comprising:

a one-piece integral peripheral wall of metal plate comprising erect wall portions, flange portions extending outwardly from the upper end of said erect wall portions, and erect reinforcement ribs spaced along opposing ones of said wall portions, each of said reinforcement ribs being defined by an inwardly bent section of the corresponding wall portion which defines a hollow substantially rectangular in tranvserse cross-section extending inwardly from the exterior surface of said wall portions, each of said reinforcement ribs being substantially vertically coextensive with the corresponding wall portion and having an upper end face in the same plane as said flange portions and extending inwardly from the corresponding flange portion;

a spring base for receiving cushioning material enclosing the seat frame; and

a spring base fitting means for mounting said spring base between two opposing reinforcement ribs on opposing ones of said erect wall portions.

---

**4,147,337**

## SHEET TRANSFER APPARATUS

**Hans B. Bolza-Schünemann, Würzburg, Fed. Rep. of Germany, assignor to Koenig & Bauer Aktiengesellschaft, Würzburg, Fed. Rep. of Germany**

**Filed Nov. 30, 1977, Ser. No. 855,856**

**Claims priority, application Fed. Rep. of Germany, Dec. 11, 1976, 2656267**

**Int. Cl.[2] B41F *13/64***

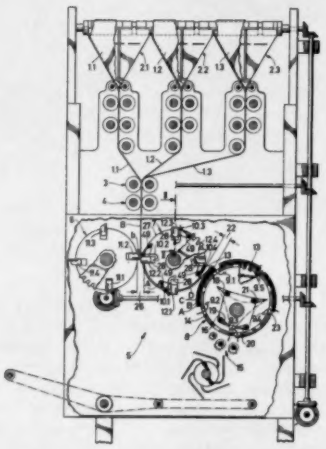
**U.S. Cl. 270—19** **9 Claims**

1. A sheet transfer apparatus for forming and transferring sheet stacks from printed webs leaving formers to a collecting and folding blade cylinder in a rotary web-fed printing press, said sheet transfer apparatus comprising:

a cutting knife cylinder having knives projecting radially outwardly from a peripheral surface thereof;

a spaced cooperating counter cut bar and transfer cylinder having a plurality of spaced support bars projecting radially outwardly from a peripheral surface of said counter cut bar and transfer cylinder, each said support bar cooperating with a complementary one of said cutting knifes to sever the web into sheet stacks;

a plurality of spaced pin sets on a peripheral surface of said



collecting and folding blade cylinder, said pin sets cooperating with said support bars to receive said sheet stacks from said counter cut bar and transfer cylinder;

means for adjusting the projection of each said support bar from said peripheral surface of said transfer cylinder to force each of said sheet stacks onto its corresponding one of said spaced pin sets; and

means for adjusting the projection of each said cutting knife to bring each said cutting knife into contact with its cooperating support bar whereby said projections of said support bars and said cutting knives may be adjusted to accomodate collect run production.

---

**4,147,338**

## METHOD AND APPARATUS FOR MANUFACTURING CONTINUOUS FORM SETS

**Karl H. Gath, Weinbergstrasse 35, D-3221 Rollinghausen, Fed. Rep. of Germany**

**Filed Jun. 20, 1975, Ser. No. 588,825**

**Claims priority, application Fed. Rep. of Germany, Jun. 25, 1974, 2430429**

**Int. Cl.[2] B41L *43/12***

**U.S. Cl. 270—37** **1 Claim**

1. The apparatus for making continuous, linearly attached form sets comprising:

(a) means for supplying and processing multiple, continuous, linearly attached bottom form sheets;

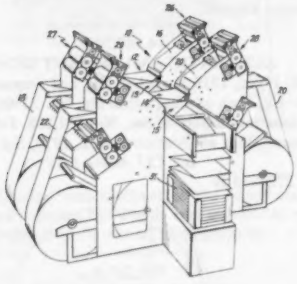
(b) a plurality of longitudinally spaced form set assembly stations;

(c) means for advancing said bottom form sheets sequentially longitudinally through said assembly stations;

(d) a form set sheet supply and processing station laterally and closely adjacent each of said assembly stations, each supply and processing station including means for supplying, processing and feeding continuous, linearly attached form set sheets to each respective assembly station in a direction laterally normal to said bottom sheet advancement direction, at least one of said form set sheet supply

stations including means for supplying, processing and feeding registered multiples of form set sheets to the respective assembly station;

(e) guide roller means disposed immediately above each assembly station for receiving and changing the direction of feed of said processed form sheets from a lateral direction relative to the assembly station to a longitudinal direction parallel to and overlying said bottom sheets, with said form set sheets lying contiguous to the underlying bottom sheets and the previously assembled form set sheets, said guide roller means including a first 45° idler roller for changing the lateral feed direction of said form set sheets to a direction longitudinally rearwardly with respect to the advancement direction of said bottom sheets, and a second idler roller over which said form set sheets pass for changing the direction of travel of said form set sheets from a longitudinally rearward to a longi-



tudinally forward direction parallel to and overlying said bottom sheets; and

(f) means for causing securement of said form set sheets to and in registry with said bottom sheets and to each other whereby successive form set sheets are progressively attached to and in registry with individual bottom sheets and form set sheets previously assembled to the bottom sheets that are advanced successively through said assembly stations, said means for causing securement of said form set sheets to each other and to said bottom sheets comprising glue dots applied to opposite surfaces of suitable form set sheets in said form set sheet supplying processing stations, said glue dots being diposed in staggered relationship between sheets to avoid thickness build-up in the areas of the glue dots in the final form set, the adhesive bonding between form set sheets and underlying sheets occurring at least in part at each assembly station.

---

**4,147,339**

## SHEET FEED AND POSITIONING MECHANISM

**Toshio Shiina, Tokyo, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan**

**Continuation of Ser. No. 669,558, Mar. 23, 1976, abandoned. This application Sep. 28, 1977, Ser. No. 837,492**

**Claims priority, application Japan, Mar. 26, 1975, 50-35295**

**Int. Cl.[2] B65H** *9/06, 9/16*

**U.S. Cl. 271—7** **9 Claims**

2. A mechanism for feeding and positioning a sheet on a substantially horizontal rectangular plate, comprising in combination;

a first elongated stop disposed along a first edge of the plate;

a second elongated stop disposed along a second edge of the plate which is perpendicular to the first edge;

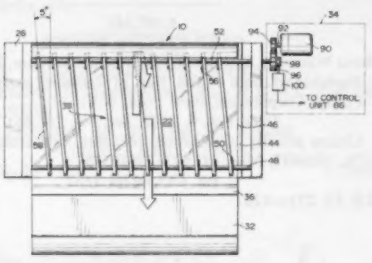
an idler shaft disposed adjacent to the first stop;

a plurality of idler pulleys supported for rotation by the idler shaft;

a drive shaft parallel to said idler shaft and rotatably supported adjacent to a third edge of the plate which is parallel to the first edge;

a plurality of drive pulleys fixed for rotation with the drive shaft;

a plurality of endless belts trained over the drive and idler pulleys respectively to form a plurality of parallel upper and lower runs, said plurality of belts having their longitudinal axes disposed in parallel planes and each belt being disposed closely above and parallel to the plate, each belt having a lower surface and forming an angle with the second edge of the plate so that the lower surfaces of the belts are movable in a direction toward both the first and second stops, said belts being constructed and arranged such that during operation, slack in the lower runs will cause the latter to yieldably engage the upper surface of the sheet when the sheet is inserted between the plate and




the belts so as to yieldably move the sheet into aligning abutment with the first and second stops and release the sheet upon said abutment;

a feed idler shaft disposed parallel to and above the drive shaft;

a plurality of feed idler rollers supported for rotation by the feed idler shaft above the drive pulleys respectively;

biasing means urging the feed idler rollers toward engagement with portions of the endless belts trained over the drive pulleys respectively; and

a guide member disposed adjacent to the third edge of the plate in such a manner that the sheet when inserted between the belts and the feed idler rollers is fed thereby into engagement with the guide member which guides the sheet into insertion between the belts and the plate.

---

**4,147,340**

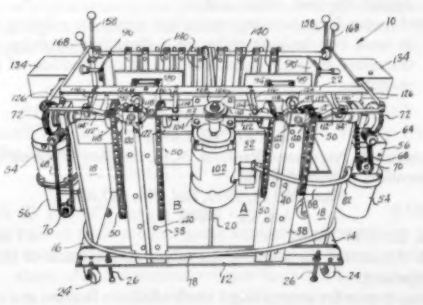
## DOUBLE STREAM STACKER AND JOGGER

**Homer F. Butts, 516 3rd Ave., NE., Grand Rapids, Minn. 55744**

**Continuation of Ser. No. 738,289, Nov. 3, 1976, abandoned. This application Dec. 5, 1977, Ser. No. 857,422**

**Int. Cl.[2] B65H** *31/32, 31/38*

**U.S. Cl. 271—218** **8 Claims**



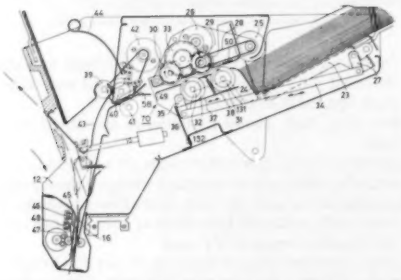
5. Apparatus for stacking and jogging cut sheets continuously in double stacks, comprising a base frame connected to two side walls and a central divider panel arranged to define a

pair of side-by-side chambers open at the front, rear and top, a horizontal elevator disposed in each chamber and means to raise and lower each elevator, a plurality of vertically disposed spaced stop fingers at the front of each chamber mounted to act as a forward stop for sheets being fed to the chamber, a pair of vertically disposed jogger plates in each chamber and a means for reciprocating one of said plates toward and away from said divider panel and the other of said plates toward and away from said stop fingers, said means including a single motor device connected by eccentrics and linkage means to both pairs of jogger plates, each of said stop fingers being adjustably affixed to a central rod for varying the spacing between the fingers, said central rod having a lever for turning the same to swing upwardly and outwardly, and locking means for securing the control rod against angular movement.

## 4,147,341
## CARD FEEDER DEVICE

**Horst Wurscher, Wilnsdorf, and Gerhard Brenner, Freudenberg-Niederndorf, both of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Feb. 8, 1977, Ser. No. 766,661**
**Claims priority, application Fed. Rep. of Germany, Feb. 19, 1976, 2606697; Mar. 12, 1976, 2610395**
**Int. Cl.[2] B65H *3/52***
**U.S. Cl. 271—122** **5 Claims**



1. A record carrier feeder device for supplying a record carrier to a processing station, and having a supply magazine for receiving a stack of carriers; a first guide channel; means for feeding at least one carrier from a stack in the magazine into the guide channel in a direction of transport, said means for feeding including a feed roller; and means for separating carriers so that only one carrier at a time is supplied from the channel, said means for separating including at least one braking roller disposed to contact the carrier fed by said means for feeding, and means for preventing rotation of the braking roller in the transport direction, wherein

said device further comprises pivoting means for mounting the magazine so as to urge a topmost carrier of the stack against the feed roller; and

said means for separating comprises means for rotating said at least one braking roller in a direction opposite said transport direction responsive to pivotal motion of said magazine.

## 4,147,342
## VIBRATING TAMPER

**Raymond A. Naramore, Penfield, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Jul. 21, 1977, Ser. No. 817,639**
**Int. Cl.[2] B65H *31/36***
**U.S. Cl. 271—221** **4 Claims**

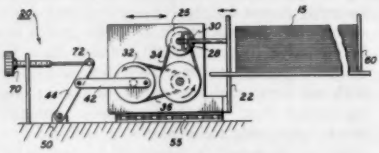
1. Apparatus for aligning the edges of the stack of sheets comprising:

tray means for supporting a stack of sheets fed one at a time to said tray means,

stop means positioned on said tray means spaced from said stack,

tamper means movable from a first position out of contact with said stack to a second position in contact with said stack urging said stack against said stop means,

means for vibrating said tamper means at a predetermined



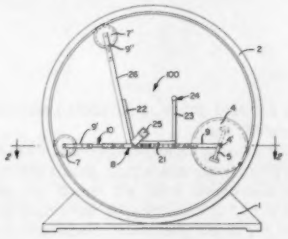
frequency as said tamper means is being moved to said second position,

drive means for moving said tamper means from said first position to said second position and then returning said tamper means to said first position whereby the sheet edges between said tamper means and said stop means are thereby aligned.

## 4,147,343
## ACROBATIC AMUSEMENT DEVICE

**Phillip R. Hyde, 1316 Kenwood La., and Samuel J. Lewis, 103 Grover Ct., both of Charlottesville, Va. 22901**

**Continuation-in-part of Ser. No. 772,138, Feb. 25, 1978, abandoned. This application Jun. 2, 1978, Ser. No. 912,249**
**Int. Cl.[2] A63G *1/12***
**U.S. Cl. 272—33 B** **10 Claims**



1. An acrobatic amusement device comprising a stationary platform; an outer wheel affixed to said platform, said outer wheel having a circular track on its inner circumference; and a riding unit within the outer wheel arranged for movement relative to said track comprising a frame, seat means on said frame, three rotatable wheels mounted on said frame, each including complementary track means which mate with the outer wheel track, and means operably connected to one of said rotatable wheels to make it a drive wheel for propelling the riding unit relative to the track within the outer wheel to provide amusement and thrill for an occupant sitting upon the riding unit, said rotatable wheels being so positioned relative to a diameter of the outer wheel that the areas of contact of two of them with said track lie on one side of said diameter and the area of contact of one of them with said track lies on the other side of said diameter, whereby said rotatable wheels by their contact with the inner surface of said track (1) cause the motion of said frame relative to said outer wheel to be rotary about an axis coincident with the axis of said outer wheel and (2) provide support for said frame relative to said outer wheel in all positions of mutual rotational orientations.

## 4,147,344
## TENSIONING TYPE PHYSICAL THERAPEUTICAL TREATMENT DEVICE

**Arthur L. Lee, 1034 Cameron Rd., Baltimore, Md. 21212**

**Filed Aug. 19, 1977, Ser. No. 812,254**
**Int. Cl.[2] A63B *21/04***
**U.S. Cl. 272—136** **5 Claims**

1. A physical therapeutical treatment system, comprising:

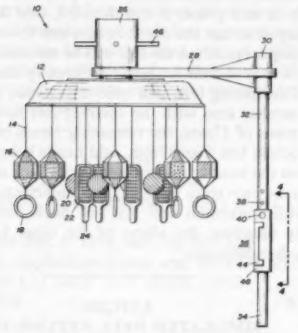
a plurality of spaced suspended toy-like objects;

a plurality of support means, each said support means having

one of said toy-like objects affixed to the lower end thereof, said plurality of support means having a range of tensile strength distributed among said plurality of support means;

a support structure to which said plurality of support means are connected by their upper ends in spaced relation to each other;

a mounting means to which said support structure is affixed; and



a tension adjusting means affixed to the upper end of each said support means by which the tension in each said support means may be varied in magnitude.

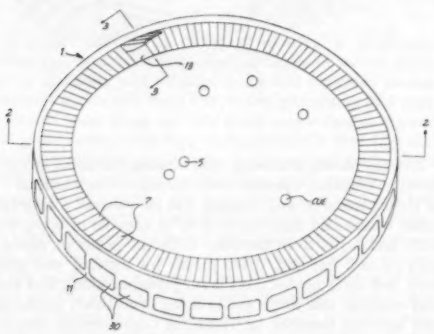
---

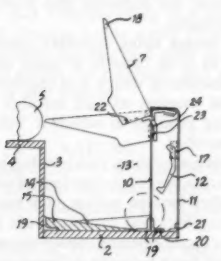
**4,147,345**

## ROUND POOL TABLE

**James R. McGovern, 205 E. 239 St., Bronx, N.Y. 10470**

**Filed Jun. 1, 1977, Ser. No. 787,627**
**Int. Cl.[2] A63D *15/00***
**U.S. Cl. 273—2** **1 Claim**





**1.** A round pool table which comprises a circular playing surface, a vertically upstanding circular structural member completely encircling said playing surface and said structural member being spaced apart by an annular ball drop area, said ball drop area being spaced below the level of said playing surface, a plurality of arcuate segments collectively arranged around the entire periphery of said playing surface, said arcuate segments being pivotally mounted to said structural member, each of said segments being pivotable independently of each other segment from a horizontally disposed position overlying said ball drop area and forming a cushion for said playing surface to a vertically disposed position forming a pocket for a ball on said playing surface, said segments being so arranged to prevent a given ball from being projected directly from said playing surface into said ball drop area when all of said segments are horizontally disposed while at the same time being so arranged to permit said given ball to be projected directly from said playing surface into said ball drop area when at least a predetermined number of said segments are vertically disposed side-by-side.

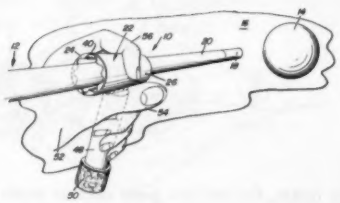
---

**4,147,346**

## EASY GLIDE CUE GUIDE

**Anthony Giannetti, 297 Germantown Rd. - R.D. #2, West Milford, N.J. 07480**

**Filed Mar. 16, 1977, Ser. No. 778,065**
**Int. Cl.[2] A63D *15/10***
**U.S. Cl. 273—23** **7 Claims**



**1.** A hand held guide for a cue stick when used to strike a cue ball comprising an elongated hollow sleeve, said sleeve being constructed of a pair of substantially identical members; hinge means pivotally connecting said members together along one longitudinal edge thereof to enable the two members to pivot in relation to each other to receive a tapered cue stick therebetween and to engage a cue stick along a substantial portion of its length at circumferentially spaced points to accurately guide a cue stick during relative longitudinal movement through the sleeve, said sleeve having internal, longitudinally extending ribs for engaging a cue stick and being longitudinally tapered with the effective circumference thereof increasing and decreasing as the tapered shaft of a conventional cue stick is moved longitudinally therethrough, the exterior of the sleeve being adapted to be engaged by the thumb and forefinger of a person using the guide to maintain supporting contact of the guide with a cue stick by forefinger pressure being exerted on the members forming the sleeve.

---

**4,147,347**

## POOL TABLE CROQUET GAME EQUIPMENT

**Donald A. Angove, Kent, Wash., assignor to Victory Games, Inc., Seattle, Wash.**

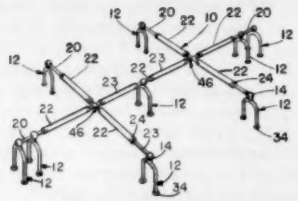
**Filed Nov. 17, 1977, Ser. No. 852,484**
**Int. Cl.[2] A63B *67/04***
**U.S. Cl. 273—57** **9 Claims**

**1.** A pool table croquet game equipment, comprising:

(a) nine vertically extending hoops, each hoop having the shape of a conventional croquet hoop and having at its top an integral dual direction hollow spacer receiving member, said hoops being spaced apart and in respective conventional croquet playing positions; and

(b) a plurality of telescoping horizontal, longitudinal and transversely positioned spacer tubes, each spacer tube

having one its ends telescopically received by one of said spacer receiving members of each of said hoops and supporting said hoops in said spaced apart and vertical positions.



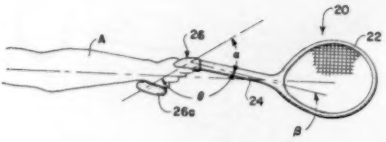
---

**4,147,348**

## TENNIS RACKET PROVIDING INCREASED HITTING POWER

**J. Kelly Lee, 20 Medallion Dr., Rochester, N.Y. 14626**

**Filed Dec. 17, 1975, Ser. No. 641,632**
**Int. Cl.[2] A63B *49/08***
**U.S. Cl. 273—73 C** **8 Claims**



**1.** A racket, for use in a game such as tennis or the like, comprising a racket head and a racket handle attached at one end to the racket head and including a throat portion at one end thereof adjacent the head and a gripping portion at the other end for gripping by a user, wherein the improvement comprises a racket handle including an angularly offset portion wherein the axis of the throat portion forms an angle of between about 28° and 36° with the axis of the gripping portion in the plane of the racket so that, in use, the centerline of the head of the racket is substantially colinear with the forearm of a user when gripping the gripping portion of the other end of said handle in a normal handshaking grip, the portion of said throat portion of said racket handle immediately adjacent the said racket head being substantially straight and being offset relative to the racket head in the plane thereof at an angle smaller than the angle between the axis of the throat portion and the axis of the gripping portion.

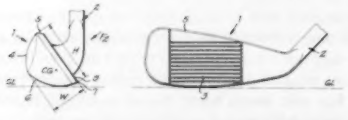
---

**4,147,349**

## SET OF GOLF CLUBS

**Philippe M. Jeghers, Herstal, Belgium, assignor to Fabrique Nationale Herstal S.A., Herstal-lez-Liege, Belgium**

**Continuation of Ser. No. 646,866, Jan. 5, 1976, abandoned. This application Mar. 15, 1977, Ser. No. 777,843**
**Claims priority, application Belgium, Dec. 18, 1975, 54726**
**Int. Cl.[2] A63B *53/04***
**U.S. Cl. 273—77 A** **4 Claims**



**1.** A set of golf clubs, more specifically of irons going from a lowest number iron, each of said clubs being constituted by a shaft and a head, each of said heads comprising a shank and a head proper having a front striking face, a sole curved lengthwise and crosswise, and a curved back, said head and shank being homogeneous and made of metal, the height of the front striking face of each of the heads of said set in a plane perpendicular to the groundline being substantially constant, wherein the center of gravity of each of said heads lies at no more than 17mm from the groundline and the ratio of the maximum height of said striking face, measured in the plane of the latter, to the maximum width of said head proper, measured perpendicularly to said plane, is less than 2.5, said heads of said set being shaped so that the distance between the center of gravity and the impact point on the ball will be minimal throughout the set, said heads of said set being differently shaped so that for heads of increasing loft, said ratio diminishes, said head of the lowest number iron with the smallest loft having the highest impact point of 17mm, the remaining heads of the set having impact points less than 17mm, said heads being shaped in said set so that the head with least loft has its back and sole surfaces of different curvature with distinct intersection whereas the head with maximum loft has its back and sole surfaces smoothly blending, the shape of the other heads of the set varying therebetween.

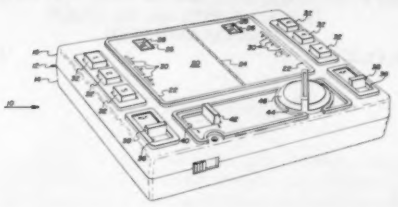
---

**4,147,350**

## SIMULATED BALL RETURN TOY

**Hikoo Usami, Tokyo, Japan, assignor to Tomy Kogyo Co., Inc., Tokyo, Japan**

**Filed Dec. 19, 1977, Ser. No. 861,828**
**Claims priority, application Japan, Dec. 21, 1976, 51/153588**
**Int. Cl.[2] A63F *9/14***
**U.S. Cl. 273—85 R** **18 Claims**



**1.** A toy having a housing, said housing including an opening having elongated, opposed ends through which at least a part of the contents of said housing can be viewed, a member located within said housing so as to be capable of being moved back and forth from between different positions along said ends of said opening, drive means for moving said member back and forth between different positions along said ends of said opening, said drive means being operatively connected to said movable member, in which the improvement comprises:

a holding means for engaging and holding said member against movement,

said holding means being movably mounted within said housing so as to be capable of being moved between an engaging position in which it is capable of engaging and holding said member as said member is moved and a non-engaging position in which it will not engage and hold said member.

**16.** A toy having a housing, said housing including an opening through which a part of the content of said housing can be viewed, a member located within said housing so as to be capable of moving back and forth between different positions along said ends of said opening, drive means for moving said member back and forth between different positions along said ends of said openings, said drive means being operatively connected to said movable member in which the improvement comprises:

said member comprising an elongated arm,

said drive means including a support plate, a reciprocating

means for moving said support plate in an irregular, oscillating manner, a crank means pivotally mounted on said support plate, oscillating means for oscillating said crank means relative to said support means and motor means for concurrently operating said reciprocating and said oscillating means,

said reciprocating means being operatively connected to said support plate, said oscillating means being operatively connected to said crank means, said motor means being operatively connected to both said reciprocating and said oscillating means, said crank means being pivotally connected to said member and including cooperating sliding connection means located on said arm of said support plate for pivotally and slidingly connecting said arm to said support plate remote from the connection of said crank means and said arm.

---

**4,147,351**

## CRASH VAN CHASE

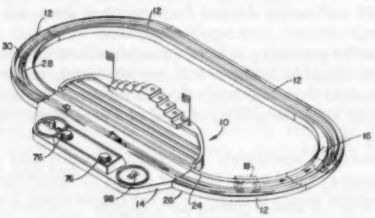
**Makoto Saito, Tokyo, Japan, assignor to Tomy Kogyo Co., Inc., Tokyo, Japan**

**Filed Jan. 5, 1978, Ser. No. 867,329**

**Claims priority, application Japan, Jan. 20, 1977, 52-5958[U]**

**Int. Cl.[2] A63F *9/14;* A63H *17/02***

**U.S. Cl. 273—86 B** **6 Claims**



**1.** A game, comprising powered vehicles, a continuous trackway having substantially separate first and second guide means for directing said vehicles along said trackway including channels within said trackway, means permitting said vehicles to travel faster along said first guide means than along said second guide means, switching means normally diverting said vehicles from said first guide means to said second guide means and retaining said vehicles in said second guide means, control means operative to actuate said switching means to divert said vehicles from said second guide means to said first guide means and to retain said vehicles in said first guide means, and means causing said vehicles to leave said trackway when moving along said second guide means when struck by another of said vehicles moving along said first guide means including a plate rotatably mounted to a portion of said vehicles normally adjacent said trackway and including a flange extending into said channels to guide said vehicles along said trackway, spring means urging said plate to rotate away from said vehicles, latching means normally holding said plate against said vehicles, and actuating means for releasing said plate when engaged by another of said vehicles.

---

**4,147,352**

## ROTATABLE EJECTION CONTAINER GAME WITH RANDOM DISTRIBUTION

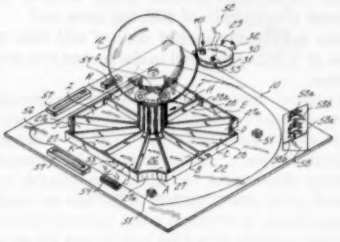
**Jaime P. Rosero, 269 S. Lafayette Pk. Pl., Los Angeles, Calif. 90057**

**Filed May 31, 1977, Ser. No. 802,151**

**Int. Cl.[2] A63F *7/02, 7/06***

**U.S. Cl. 273—93 R** **2 Claims**

**1.** An apparatus suitable for use as a game or as a means for demonstrating the laws of probability comprising an at least partially spherical container, means fixed to the container for ejecting a ball into the container at the portion of the container having the greatest diameter such that the ball may roll in a random unrestricted manner on the interior wall of the container, means for rotating the container 360° thereby to permit one to operate the ejecting means from any position around the game without moving, means generally closing the bottom of the container but provided with a plurality of openings each of diameter greater than the diameter of the ball, receiving means for receiving a ball passing through any one of said openings, means dividing said receiving means into a plurality of zones corresponding in number to the plurality of openings and respective means for conducting a ball passing through a respective one of said openings to a respective one of said zones, the conducting means comprising a plurality of tubes of approximately the same diameter as the openings and corresponding in number to the plurality of openings, the ejecting means comprising a pair of superimposed substantially horizontal plates with a space provided therebetween and an ejection mechanism housed between the plates, the ejection mechanism comprising first and second levers, one end of the first lever being free for engagement by the hand of an operator of the apparatus, the second lever being of an angular configuration including two legs merging at a corner, the other end of the first lever being so closely spaced from said corner that the



path of movement thereof intercepts said corner of the second lever, a substantially horizontal ejection chamber for carrying a ball to be ejected into the container, a substantially vertical loading chamber formed through the upper of said plates above said ejection chamber so that the ball will be fed by gravity from said loading chamber into said ejection chamber, a hammer extending into the ejection chamber for striking the ball, means pivotally connecting one end of the hammer to a leg of the second lever and the other end of the hammer being free for striking the ball, the other leg of the second lever having a slot formed therein, a pin rigidly connected to the plates and slidably received in the slot, a first spring arranged to rotationally bias the second lever in the rotational direction which moves the hammer toward a ball in the chamber, a second spring arranged to rotationally bias the first lever in the rotational direction opposite the rotational biasing of the second lever, whereby manual actuation of the first lever actuates the second lever against the bias of said spring and subsequently releases said second lever thereby to cause the hammer first to substantially linearly partly retract from said ejection chamber thereby to permit the ball to drop from the loading chamber into the ejection chamber and then to follow the same path in reverse to strike and eject the ball.

---

**4,147,353**

## SOCCER RETRIEVER

**Jerrell O. Moore, 1807 Glenfield, Dallas, Tex. 75224**

**Filed Mar. 16, 1977, Ser. No. 754,898**

**Int. Cl.[2] A63B *69/00, 43/00***

**U.S. Cl. 273—95 A** **4 Claims**

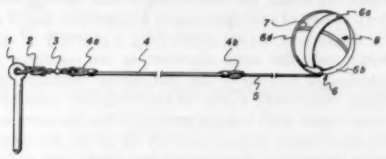
**1.** An apparatus for holding and retrieving a game ball comprising:

(a) an anchor means;

(b) an elongated cord member having a first end and a second end;

(c) means to affix the first end of said cord member to said anchor means;

(d) an adjustable ball holder for receiving and holding said game ball, said adjustable ball holder including four equal length elongated pieces of webbing material having a first end and a second end, said pieces being secured at their first ends, whereby each of said four elongated pieces of webbing material extend outwardly at right angles from each adjacent piece with the length of said elongated



pieces being sufficient to reach partially around said ball, said adjustable ball holder further including a continuous elastic band member affixed to the mid-point of each of said four elongated pieces of webbing materials, said continuous elastic band member being sized to adjustably surround playing balls of differing sizes; and

(e) means to affix the second ends of said four elongated pieces of webbing material to the second end of said cord member.

---

**4,147,354**

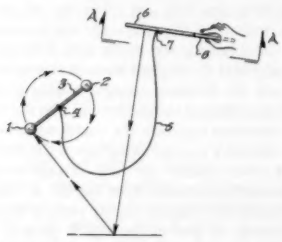
## PADDLE BALL GAME

**Peter A. Balistrieri, 1412 S. Park Ave., Buffalo, N.Y. 14220**

**Filed Oct. 19, 1977, Ser. No. 843,529**

**Int. Cl.[2] A63B *65/12***

**U.S. Cl. 273—97 R** **2 Claims**



1. A game of skill, comprising:

a dumbbell-shaped member having two balls mounted on opposite ends of a rod, said dumbbell-shaped member having its center of gravity located at the midpoint of said rod;

a paddle; and

an elastic member having one end mounted on the paddle and having its other end secured to said dumbbell-shaped member at said center of gravity;

whereby the user may strike one of said balls with said paddle to cause said dumbbell-shaped member to rotate about said center of gravity.

**4,147,355**

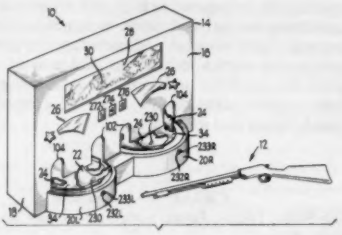
## TARGET SHOOTING APPARATUS

**Gordon A. Barlow, Evanston; Gunars Licitis, Lombard, and John R. Wildman, Hanover Park, all of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.**

**Filed Feb. 14, 1977, Ser. No. 767,393**

**Int. Cl.[2] F41J *5/02***

**U.S. Cl. 273—101.1** **22 Claims**



1. A target apparatus, comprising:

a frame;

a plurality of target devices movably mounted on the frame;

a plurality of target impeller means operatively associated with said target devices for moving at least one of the target devices upon actuation thereof;

means for providing light of a predetermined intensity;

circuit means including at least one photodetector remotely disposed from said target devices for providing an output signal upon the sensing of light of a predetermined intensity; and

an actuator operatively associated between said circuit means and said target impeller means for actuation of said impeller means in response to the output signal from said circuit means as actuated by said light striking one of the photodetectors, said actuator including a single solenoid connected to said circuit means and linkage means between said solenoid and said plurality of target impeller means whereby all of the target impeller means are actuated in response to the output signal actuating said solenoid.

---

**4,147,356**

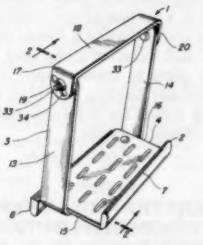
## GOLF SWING PRACTICE DEVICE

**John R. Brandell, 702 Waukegan Rd., Glenview, Ill. 60025**

**Filed Jan. 23, 1978, Ser. No. 871,224**

**Int. Cl.[2] A63B *69/36***

**U.S. Cl. 273—183 B** **14 Claims**



1. A golf swing practice device comprising

a. a tread plate

(1) having (a) a front side and (b) a rear side, and

(2) sloping downwardly from said rear side to said front side,

b. two elongated supporting members

(1) disposed in spaced relation to each other and

(2) directly attached to said rear side of said tread plate in upwardly projecting relation thereto, and

c. a crossbar extending between and mounted on the upper end portions of said supporting members.

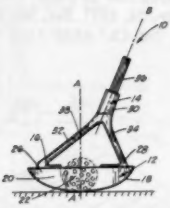
---

4,147,357

## GOLF PUTTER HEAD

William H. Strop, 1st Federal Bldg., 7th and Felix Sts., St. Joseph, Mo. 64501

Filed Jul. 18, 1977, Ser. No. 816,500
Int. Cl.[2] A63B 53/04
U.S. Cl. 273—164 6 Claims



1. A golf putter head for mounting on a golf club shaft of a putter, the putter head used for putting a golf ball on a putting surface, the putter head comprising:

a base, said base having a top portion, a bottom portion, a toe portion, a heel portion, a front portion, and a rear portion, the top portion horizontally disposed, the bottom portion semi-circular with the ends thereof extending upwardly joining the ends of the top portion, the front portion vertically disposed and forming a face plate for striking the golf ball;

sighting means formed in said base and centered thereon;

an inverted "Y" shaped yoke having a neck portion with a forward arm and a rearward arm, the forward arm extending downwardly above the center of said base with the end of the forward arm attached to the top of the toe portion of said base, the rearward arm extending downwardly with the end of the rearward arm attached to the top of the heel portion of said base; and

sighting means formed in said yoke centered above said sighting means on said base when the putter head is balanced on top of the putting surface and said sighting means are in alignment.

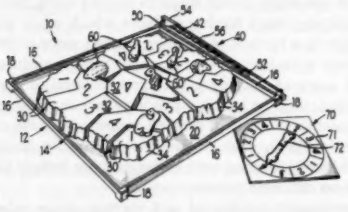
---

4,147,358

## VIBRATING GAME APPARATUS WITH LOOSELY INTERFITTING SURFACE ELEMENTS

Erick E. Erickson, Chicago, Ill., assignor to Marvin Glass & Associates, Chicago, Ill.

Filed Jan. 26, 1978, Ser. No. 872,426
Int. Cl.[2] A63F 3/00
U.S. Cl. 273—241 10 Claims



1. Game apparatus, comprising:

a base including a peripheral frame supporting a floor adapted for vibratory motion;

means for imparting vibratory motion to said floor;

a plurality of puzzle-like elements adapted to be mounted on said floor and interfitted together to form an elevated playing surface, each of said elements being movable independently in response to vibration of said floor whereby a break may be developed in said playing surface between edges of adjacent elements; and

one or more playing pieces adapted to be placed on said playing surface for movement thereon until a break formed by vibration of said floor causes a playing piece to move from said playing surface to touch said floor.

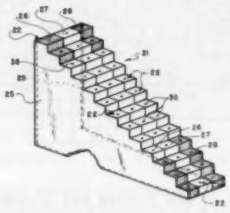
---

4,147,359

## GAME EQUIPMENT HAVING STEPPED RAMP MEANS

Bobby J. King, 3415 Simmons St., Oakland, Calif. 94619

Filed Jun. 17, 1977, Ser. No. 807,489
Int. Cl.[2] A63F 3/00
U.S. Cl. 273—241 4 Claims



1. Game equipment for playing a game including chance determining means, at least one elongated ramp means formed with a plurality of steps extending substantially across the width dimension of said ramp means to provide game playing surfaces; a plurality of side-by-side substantially parallel pathways defined on said steps, said pathways being formed with distinct indicia thereon; and a plurality of playing pieces provided as a set for each player with each playing piece having a distinct indicia thereon corresponding to said indicia on said pathways, wherein the improvement in said game equipment is comprised of:

said game equipment includes at least two indepently movable elongated ramp means each formed with three continuous stepped side-by-side pathways thereover, said ramp means being further formed for positioning in an array with a highest of said steps of each of said ramp means in close juxtaposed relation to the highest steps of the remainder of said ramp means.

---

4,147,360

## FOURSIDED CHESS GAME

Kenneth M. Bailey, deceased, late of Pointe Coupee Parish, La.; by Alyce B. Raymond, heir, 10607 Kathleen Ave., Huntley, Ill. 60142; by Bruce K. Bailey, heir, P.O. Box 5315, c/o Aramco, Dhahran, Saudi Arabia; by Kay E. B. McElreath, heir, 2048 Laurel Ave., Gretna, La. 70053, and by Marsha L. B. Wood, heir, 652 West Niagra Cir., Gretna, La. 70053,

Filed Jun. 21, 1974, Ser. No. 481,777
The portion of the term of this patent subsequent to Apr. 3, 1994, has been disclaimed.
Int. Cl.[2] A63F 3/02
U.S. Cl. 273—261 5 Claims

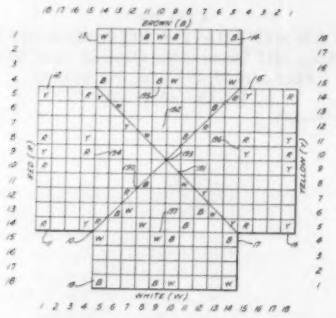
1. A chess board device for chess type play among two to four players comprising:

(a) a board, having

(1) a square central section being sub-divided into a plurality of smaller squares and having two diagonal lines thereon further subdividing said central section into four triangular central sub-sections, and

(2) four wing sections, each being a rectangular section extending from one side of said cental section, contiguous

therewith and forming with said associated triangular sub-section a complete board sub-section of said board, and being likewise sub-divided into a plurality of squares the same size as said central section squares, said board having said squares alternately colored in four different colors, each board sub-section having said squares colored alternately. with but two of said four colors, opposite sub-sections having the same two colors for their squares, wherein said color scheme serves to identify and distinguish each of said squares and wherein said diagonals serve as reference indicators for perpendicular piece movement into adjacent sub-sections; and



(b) a set of playing pieces for game play on said board comprising:

(1) the pieces of a conventional chess set for movement according to conventional chess rules, said playing pieces to be placed on the outermost two rows of squares of at least two of said wing sections in conventional chess arrangement.

---

**4,147,361**

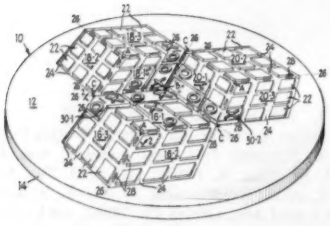
**GAME APPARATUS**

**Alex Imatt, Chicago, Ill., assignor to Marvin Glass & Associates, Chicago, Ill.**

**Filed Jan. 26, 1978, Ser. No. 872,550**

**Int. Cl.[2] A63F *3/00***

**U.S. Cl. 273—271** **13 Claims**



1. Game apparatus comprising:

a base having a plurality of diamond shaped matrices defined on a playing surface disposed on opposite sides of a dividing line between adjacent matrices,

each of said matrices including a plurality of diamond shaped play spaces with an edge row of play spaces adjacent said line and a parallel row remote therefrom, said matrices including parallel columns intersecting said dividing line at an acute angle and the columns of the matrices on opposite sides of said dividing line angularly intersecting one another at said line;

a plurality of diamond shaped playing pieces adapted to fit over a pair of adjacent play spaces in either of said matrices and including a pair of different symbols thereon, each symbol adapted to be positioned over one of said adjacent play spaces; and

a plurality of angle shaped playing pieces having a pair of diamond shaped legs intersecting along a center line with a different one of said symbols on each leg, said angle shaped playing pieces adapted to be placed over a pair of playing spaces in different matrices on opposite sides of said dividing line with the center line thereof on said dividing line.

---

**4,147,362**

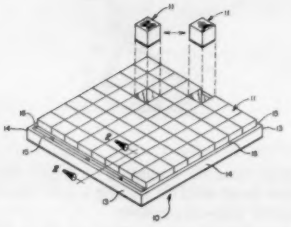
**CHESS GAME APPARATUS**

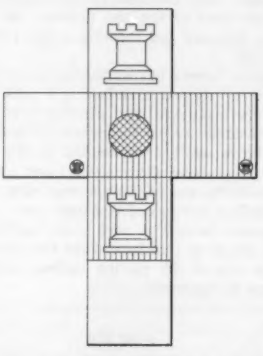
**Edward M. Fisher, 3506 Rue de Fleur, Columbus, Ohio 43221**

**Filed Sep. 14, 1977, Ser. No. 833,009**

**Int. Cl.[2] A63F *3/02***

**U.S. Cl. 273—282** **14 Claims**





1. A game apparatus comprising a plurality of playing pieces of cubic configuration having planar surfaces which are adapted to be selectively positioned on a planar support surface in an assembled array having surfaces of adjacent pieces juxtaposed with each piece defining a playing space of a playing field having a predetermined number of such playing spaces with upwardly facing surfaces thereof being contiguous and each playing piece having surfaces which when placed in juxtaposition to a surface of another playing piece enable each playing piece to be selectively removed from its position in the assembled array of playing pieces and inserted in a position from which any other selected playing piece may be removed from the assembled array of playing pieces within the confines of the playing field, each of said playing pieces having two surfaces thereof provided with distinguishing indicia identifiable as to two different playing spaces,

a predetermined number of said playing pieces selected to form a set of game pieces for each of two players, the game pieces in each set having at least two other of said surfaces provided with game piece indicia representative of respective ones of each of the game pieces in a set, each of said surfaces of a game piece having the game piece

indicia formed thereon also being provided with a respective one of said indicia identifiable with a playing space, the two surfaces being provided with different playing space indicia.

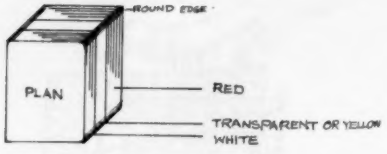
---

**4,147,363**

## MULTI-GAME DECK OF TILES

**Sang C. Lee, and Minja P. Lee, both of 68 Wendt La., Wayne Township, Passaic County, N.J. 07470**

**Filed Sep. 27, 1977, Ser. No. 837,004**
**Int. Cl.[2] A63F *1/00***
**U.S. Cl. 273—304** **1 Claim**




1. A deck of 168 tiles, said deck comprising: 120 tiles bearing month indicia with ten tiles thereof each representing the months of January through December; forty tiles bearing season indicia with ten tiles thereof each representing the seasons of spring, summer, autumn and winter; and eight tiles having joker indicia; fifty-two selected ones of said month and season indicia bearing tiles being additionally provided with club, diamond, heart and spade indicia and the rankings ace through king to constitute a conventional bridge deck; said indicia thereby enabling said deck or portions of said deck to be selectively used to play a wide variety of card games including any traditional western card game and any traditional Japanese card game.

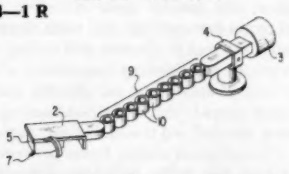
---

**4,147,364**

## NON-VIBRATION TONE ARM

**Hisayoshi Nakatsuka, Mitaka, Japan, assignor to Namiki Precision Jewel Co., Ltd., Tokyo, Japan**

**Filed Dec. 12, 1977, Ser. No. 859,536**
**Claims priority, application Japan, Mar. 30, 1978, 52-35620**
**Int. Cl.[2] G11B *3/10***
**U.S. Cl. 274—1 R** **10 Claims**




1. A tone arm for use in a phonograph record player adapted for connection to a holder for the tone arm, comprising a head shell adapted to support a stylus cartridge, said tone arm further comprising at least two hollow members, the first one of which is connected to said head shell and the second one of which is connected at one end thereof to said first hollow member, the other end thereof being adapted for connection to said tone arm holder, each said hollow member having an orientation axis extending through the hollow portion thereof where the angle $\theta$ between said orientation axis and an arm shaft axis extending between said head shell and said tone arm holder is greater than 0° whereby a mechanical vibration introduced into said tone arm from a vibration source comprising either said head shell or said tone arm holder is divided between two paths both of which start at the connection point between (a) the hollow member connected to the vibration source and (b) the vibration source and then pass around the respective sides of the hollow member connected to the vibration source to a cancellation point where the vibrations in the two paths substantially cancel one another due to the difference in their respective directions of travel.

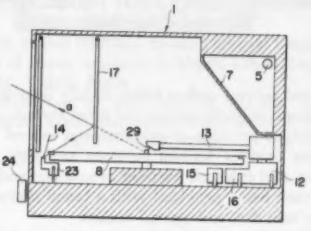
---

**4,147,365**

## RECORD PLAYER

**Junichi Kurata; Kazushige Ishikawa, and Nozomu Nagashima, all of Saitama, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan**

**Filed Oct. 12, 1977, Ser. No. 841,416**
**Claims priority, application Japan, Oct. 13, 1976, 51-122555**
**Int. Cl.[2] G11B *3/06***
**U.S. Cl. 274—9 RA** **5 Claims**




1. A record player capable of automatically setting a player commencement position of a tonearm on a record disc by a remote control operaton, said player including a movable tonearm having a pick-up stylus mounted at one end thereof, the improvement comprising:

housing means integrally attached to the record player;

viewing means in a front surface of said housing means through which the record player may be observed;

position control means for controlling the commencement position of said tonearm on said record disc, said position control means including a light source movable in a direction substantially parallel to the movement direction of said stylus for indicating a set commencement position; and

a semi-transparent mirror disposed within said housing at a position between said light source and said tonearm, the position of said tonearm and said set commencement position as indicated by the virtual image of said light source in said mirror being simultaneously viewable through said viewing means.

---

**4,147,366**

## RUBBERIZED ROLL FOR THE SEALING DEVICE OF A HIGH PRESSURE APPARATUS

**Leonid G. Gorodissky; Stanislav M. Evtikhovich, both of Moscow; Igor P. Grigoriev; Nikolai A. Kvashnin, both of Ivanovo; Vladislav I. Sokolov, Kursk; Larisa S. Chekreneva, Kursk; Rostislav G. Birdus, Kursk; Maria A. Zaitseva, Kursk; Jury T. Kryazhev, Kursk; Galina V. Kuzminova, Volzhsky Volgogradskoi oblasti, all of U.S.S.R., and Nikolai T. Romanov, deceased, late of Moscow, U.S.S.R. (by Anastasia T. Romanov, administrator), assignors to Vsesojuzny Nauchno-Issledovatelsky i Experimentalny Institut po Perabotke Khimicheskikh Volokon, U.S.S.R.**

**Filed Mar. 31, 1978, Ser. No. 892,092**
**Int. Cl.[2] B08B *3/00*; F16J *15/54***
**U.S. Cl. 277—22** **2 Claims**

1. A rubberized roll for the sealing device of a high-pressure apparatus, comprising:

a shell;

a first pin arranged at one end of said shell;

a second pin arranged at the opposite end of said shell;

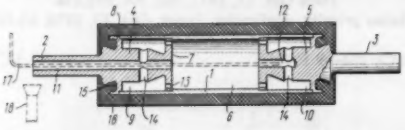
said first and second pins having enlarged portions protruding into said shell at both ends thereof;

said shell having an interior defined by said enlarged portions of said pins;

said first pin having an axial through duct for a cooling agent to feed into said inner cavity;

said enlarged portion of said second pin having an axial duct for the cooling agent to pass;

said enlarged portions of said first and second pins having first collars located at the ends of said enlarged portions facing said inner cavity of said shell, and second collars located at the opposite ends of said enlarged portions, said



first and second collars being tightly held up with their peripheral surfaces against the inner surface of said shell;

said enlarged portions of said first and second pins having annular cavities defined between said first and second collars, said enlarged portions of said first and and second pins each being provided with a radial through duct between said first and second collars;

said first collars having holes for said annular cavities to communicate with said interior of the shell.

---

**4,147,367**

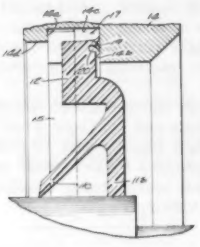
## SHAFT SEAL FOR BEARING HOUSING

**Larry C. Smith, New Berlin, and Alan M. Nienhaus, Racine, both of Wis., assignors to Rexnord Inc., Milwaukee, Wis.**

**Filed May 30, 1978, Ser. No. 910,917**

**Int. Cl.[2] F16J *15/32***

**U.S. Cl. 277—152** **12 Claims**



1. An end seal for insertion in the annular groove of a shaft bearing housing wherein the width of the groove is within close tolerances of such as 0.003 inches (0.16 mm) and some shaft angularity or eccentricity must be accommodated initially by radial movement of the seal, such a groove having opposite parallel annular faces including a rear face nearer the interior of the housing and a forward face nearer the end of the housing, said seal being of a molded material having a Durometer hardness of in the order of 55D and comprising:

(a) a radially inward section having a running and sealing fit with the shaft and

(b) a radially outer body having

(1) a forward face to engage the forward face of the groove and including forward means engageable with the housing to prevent rotation of the seal with the shaft,

(2) a lip at the rear and radially outward corner of the seal body, said lip extending axially to engage the rear face of the groove and being of a length in the order of 0.04 inches (0.30 mm) such that different portions may be leaned radially inwardly and outwardly and the intermediate folded portions maintain a sealing engagement with the rear face of the groove.

**4,147,368**

## PIPE SEAL

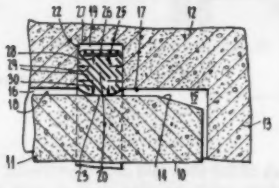
**Clifford A. Baker, Glen Waverley, and Norwood L. Harrison, Mount Waverley, both of Australia, assignors to Humes Limited, Melbourne, Australia**

**Continuation of Ser. No. 565,610, Apr. 7, 1975, abandoned. This application Dec. 1, 1976, Ser. No. 746,318**

**Claims priority, application Australia, Apr. 5, 1974, 7179/74**

**Int. Cl.[2] F16J *15/12***

**U.S. Cl. 277—182** **9 Claims**



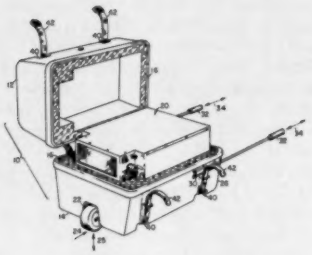
1. A pipe sealing arrangement comprising: a pipe spigot with an outer tubular surface; a pipe socket with an inner tubular surface and an annular recess; a resilient annular sealing member which fits into said annular recess in said socket, said recess having a continuous and unbroken outer peripheral wall and having substantially parallel side walls; said sealing member having an inner surface in pressure sealing contact with said outer tubular surface of the spigot; said sealing member having side surfaces in pressure sealing contact with said side walls of the recess; a continuous annular band of fixed length extending around and in contact with said sealing member and absorbing outward radial forces resulting from the compression of said sealing member; said sealing member and said annular band associated therewith being fitted into said recess; a continuous annular space between said outer wall of the recess and said sealing member; said annular space extending over the full width of said recess between said side walls thereof and being maintained after the seal is effected; said sealing member and said band cooperatively inhibiting transmission of radial forces to said outer wall of said recess and thereby inhibiting transmission of radial forces to said socket, said sealing member and said band being stressed and translating said radial forces into an increase of longitudinal sealing forces between said sealing member and said side walls; said sealing member applying inward radial forces forming a seal between said sealing member and said spigot, said radial forces being applied substantially by said sealing member and said annular band, said outer wall of said recess being free of said radial forces; said sealing member being stressed for applying longitudinal forces between said sealing member and said side walls of said annular recess, said longitudinal forces only forming a pressure seal between said sealing member and said sockets; said sealing member applying pressure on said spigot substantially independent of the internal dimensions of said outer wall of said recess and independent of any ovality of said spigot; said pressure applied by said sealing member on said spigot being substantially independent of relative transverse movement of said socket and said spigot, said sealing member and said band having a predetermined stress relationship inhibiting transmission of radial forces to said socket for inhibiting fracture of said socket and reducing the permissible wall thickness of said socket.

**4,147,369**

## MATERIAL HANDLING SYSTEM

**Paul K. Simpson, Milford, N.H., assignor to Sanders Associates, Inc., Nashua, N.H.**

**Filed Oct. 14, 1977, Ser. No. 842,143**
**Int. Cl.² B62B *1/20***
**U.S. Cl. 280—30** **7 Claims**



7. Apparatus for transporting goods comprising:

a shipping container having a wheel well integrally formed at one end of the bottom of the shipping container;

a releasably attachable wheel assembly including a wheel and an inverted U-shaped spring having a flexibility such that its two free ends may be manually squeezed together to permit insertion of the wheel assembly into said well for movement of said container and to permit easy removal of said wheel assembly so that the container may be reused, said wheel being mounted between the sides of said U-shaped spring;

a pair of arms, and

means for releasably attaching said arms to said container at an opposite end of said container, whereby said wheel assembly and said arms convert said container into a wheelbarrow configuration.

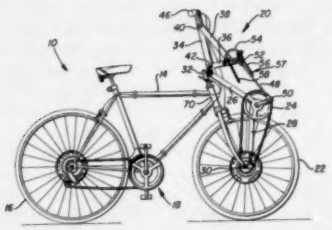
---

**4,147,370**

## FRONT WHEEL DRIVE FOR A BICYCLE

**Ben Lindsey, Jr., Box 1256, Maljamar, N. Mex. 88264**

**Filed Dec. 29, 1977, Ser. No. 865,705**
**Int. Cl.² B62M *1/12***
**U.S. Cl. 280—234** **11 Claims**



1. A bicycle having a main frame, a rear driven wheel assembly affixed to said frame; means by which said rear wheel assembly is rotated by a foot operated crank assembly; a forward front wheel, a front fork, said front wheel being rotatably mounted to a lower end of said front fork, an upper marginal end of said front fork is journaled to said main frame for steering the bicycle;

handlebar means pivotally mounted to an upper end of said front fork and arranged for steering the bicycle, while at the same time said handlebar means can be pivotally moved forward and rearward;

a drive sprocket means mounted in journaled relationship to said front fork for rotating said front wheel, a driven sprocket connected to said front wheel, an endless chain connecting said drive and said driven sprockets together; a connecting rod connected between said handlebar means and said drive sprocket means for cranking said drive sprocket means in response to pivotal forward and rearward movement of said handlebar means;

biasing means, including a spring, for biasing said connecting rod at each extreme limit of travel thereof to provide a biasing force which moves the connecting rod off-center respective to said drive sprocket each 180° rotation thereof.

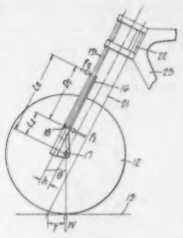
---

**4,147,371**

## TELESCOPIC FRONT FORK CONSTRUCTION FOR MOTORCYCLE

**Isamu Morita, Asaka; Hidehiko Inoue, Oai, and Yasuo Ohashi, Fujimi, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Apr. 29, 1977, Ser. No. 792,204**
**Claims priority, application Japan, May 14, 1976, 51-60738**
**Int. Cl.² B62K *25/08***
**U.S. Cl. 280—276** **4 Claims**



1. In a motorcycle or the like, the combination of: a frame, a front wheel, a front fork assembly pivoted to the frame and straddling the front wheel, said assembly including inclined paralled fork pipes telescopically received in bottom tubes having parallel bores adapted to receive oil for lubrication, the axes of said fork pipes and said bottom tubes bores being inclined downward in a forward direction and defining an inclined plane, said inclined plane forming an angle with respect to a horizontal surface on which the front wheel rests, means for mounting said wheel on said bottom tubes for rotation about an axis spaced rearward of said inclined plane, the lower end of each fork pipe being tapered to a small angle between 3 minutes and 6 minutes to create an oil wedge between said telescoping parts.

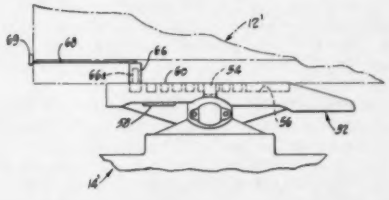
---

**4,147,372**

## DIRECTIONAL CONTROL COUPLING MECHANISM

**Alray Sumpter, 936 W. 17th St., Port Arthur, Tex. 77640**

**Filed Jun. 9, 1977, Ser. No. 804,867**
**Int. Cl.² B62D *53/08***
**U.S. Cl. 280—433** **14 Claims**

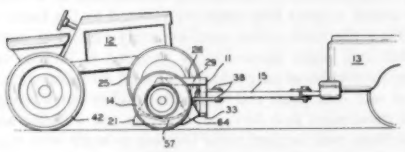


11. A coupling mechanism having a longitudinal axis and adapted for attaching a draft vehicle to a drawn vehicle, said

mechanism being adapted for use in facilitating the backing up operation on the drawn vehicle and comprising a member having an arcuate orientation of generally laterally spaced abutment means extending to opposite sides of said axis and adapted to be supported by the draft vehicle and a support adapted to be secured to and supported by the drawn vehicle and mounting another abutment means, the first mentioned abutment means and the second mentioned abutment means being pivotal in a generally horizontal plane relative to one another, at least one of said abutment means being selectively extendable by power means for causing interlocking coaction when so extended between the first and second mentioned abutment means in whatever positional relation the latter abutment means are disposed in at that instant, so as to transmit force from the first mentioned abutment means to said second mentioned abutment means in a direction laterally of the longitudinal axis of said mechanism whereby the drawn vehicle during a backing up operation tends to move in the same general direction as the draft vehicle, said extendable abutment means normally being in retracted condition and when in said retracted condition being inoperative to cause interlocking coaction between said first and second mentioned abutment means, said member comprising a fifth wheel plate having a slot therein and said support including a king-pin receivable in relatively movable relation in said slot, providing for relative pivotal movement of the drawn vehicle and the draft vehicle, said first mentioned abutment means being disposed on said fifth wheel plate, and means for selectively locking the king-pin in pivotal relation to the slot in the fifth wheel plate.

---

**4,147,373**
**VEHICLE TOW TRAILER**
**Edward L. Cully, Rte. 1, Box 139, Van Wert, Ohio 45891**
**Filed Aug. 31, 1977, Ser. No. 829,270**
**Int. Cl.[2] B60P *3/12***
**U.S. Cl. 280—445** **6 Claims**



1. A vehicle tow trailer for accomodating a set of towed vehicle wheels comprising:

a front and rear generally horizontally extending transverse lower frame member;

opposed frame sides upstanding from and secured adjacent the ends of said transverse lower frame members; said sides each including a portion extending forwardly of the frame;

an abutment bar extending between and secured to said opposed forwardly extending portions;

wheel cradles extending between and secured to said transverse lower frame members;

a pair of selectively steerable wheels secured to said frame-sides supporting said frame and having their axes of rotation above said cradles and rearward on said frame from a vertical plane of projection of the axes of rotation of wheels of vehicles adapted to be towed on said trailer when said towed vehicle wheels are mounted in said cradles for towing;

said abuttment bar having a horizontal plane of projection at a height above said cradles approximately the radius of the cradle mounted wheels of the towed vehicle;

said abutment bar having a vertical plane of projection at a location ahead of the vertical plane of projection of the axes of rotation of said steerable wheels whereby the axes of rotation of the cradle mounted wheels of the towed vehicle are ahead of the axes of rotation of said steerable wheels to impose a downward moment on said cradles and frame ahead of the axes of rotation of said steerable wheels;

a drawbar; a pivotal coupling between said frame and said drawbar having a generally vertical, fixed pivot axis on said frame whereby the downward moment imposed by towed vehicle wheels in said cradles is imposed on a towing vehicle;

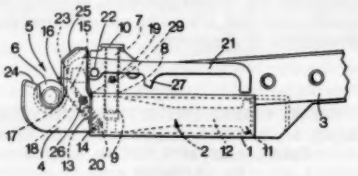
a steering linkage from said drawbar to said steerable wheels arranged to cause said wheels to track said drawbar in their angular relationships to said frame;

skids formed of the lower structural elements of said opposed frame sides adjacent said steerable wheels and of said front and rear transverse lower frame members, said skids having a front upwardly inclined length ahead of the location of support of said wheels on said frame, and a generally horizontal length adjacent said wheels, and said front and rear transverse frame members having generally flat surfaces respectively coplanar with and adjacent to said inclined and horizontal lengths; and

means to lock the angular relationship of said wheels to said frame.

---

**4,147,374**
**DRAWBAR**
**Robert H. F. Jeffes, Stroud, England, assignor to Jeffes Engineering Limited, Gloucestershire, England**
**Filed May 31, 1977, Ser. No. 801,473**
**Claims priority, application United Kingdom, Jun. 5, 1976, 23339/76**
**Int. Cl.[2] B60D *1/04***
**U.S. Cl. 280—478 R** **8 Claims**



1. A drawbar having an arm by which the drawbar is to be attached to a tractor and at one end of said arm a hook member defining a recess into which a coupling member having a convex outer surface is to be inserted, the walls of the recess conforming with the shape of the outer surface of the coupling member to permit the latter to turn in the recess, the drawbar also including a retaining pin having an outer end and an inner end and movable in a socket in the hook member between a retaining position in which said outer end of the retaining pin extends from the socket to constrict the mouth of the recess and thereby, where the coupling member has been positioned in the recess, to retain the coupling member in the recess, and said inner end is located within the socket, and a release position in which said outer end of said retaining pin is retracted into the socket and said inner end also remains located within the socket, spring means engaging said retaining pin to move the retaining pin to its retaining position, and thereby to enable the coupling member to be removed from and inserted into the recess, stop means to limit the outward movement of the retaining pin and hence to determine the position of the outer end of the retaining pin in its retaining position, and release means to move the retaining pin against the force of the spring means to said release position, said release means comprising a lever pivotally mounted on said arm to engage said outer end of said retaining pin to depress said retaining pin against the force of said spring means into said release position.

## 4,147,375
## CENTRAL ARTICULATION FOR A SELF-PROPELLING, ARTICULATED VEHICLE

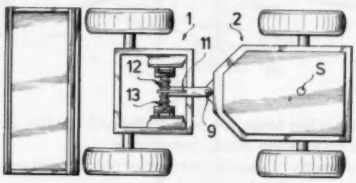
**Hans Bangert, Sprockhovel, and Peter Waterkamp, Dortmund, both of Fed. Rep. of Germany, assignors to O&K Orenstein & Koppel Aktiengesellschaft, Berlin, Fed. Rep. of Germany**

**Filed Dec. 27, 1977, Ser. No. 864,808**

**Claims priority, application Fed. Rep. of Germany, Dec. 24, 1976, 2658932**

**Int. Cl.[2] B60D *1/00***

**U.S. Cl. 280—483** **6 Claims**




1. In a central articulation with pivot axles standing perpendicularly to one another for a self-propelling articulated vehicle comprising two vehicle parts, including a front car and a rear car, which are mutually moveable with respect to one another, whereby the steering takes place by mutual pivoting of the two vehicle parts with respect to one another about a vertical axle of the central articulation and the adjustment of the vehicle to unevenness of the ground takes place by a pendulum course of movement of the two vehicle parts with respect to one another about an axle which is horizontal in the longitudinal direction and a restoring device counteracts the pendulum course of movement of the front car and of the rear car by means of compression springs, the improvement comprising

means comprising rubber hollow springs for cooperatively providing a restoring force counteracting the pendulum course of movement of the front car relative to the rear car,

tensioning means for prestressing said hollow springs,

said tensioning means comprises,

a tensioning screw extends along a central axis of each of said hollow springs and operatively engages the latter,

holders connected to the front car and to said hollow springs, respectively,

bushings mounted in said holders and said hollow springs, respectively,

an adjustment nut is each adjustably threaded on said tensioning screw and is guided in said bushings, respectively, with peripheral play.

---

## 4,147,376
## RESILIENT HITCH LINKAGE FOR CONNECTION BETWEEN A TOWING VEHICLE AND A TOWED APPARATUS

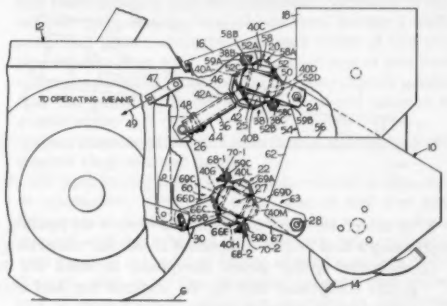
**John J. Slazas, Cedarburg, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.**

**Filed Dec. 2, 1977, Ser. No. 856,771**

**Int. Cl.[2] B60D *1/00***

**U.S. Cl. 280—489** **16 Claims**

15. In combination, a ground working implement adapted to be towed behind a towing apparatus, an upper resilient hitch linkage pivotally connected at one end thereof to said implement and adapted to be pivotally connected at an opposite end thereof to the towing apparatus, and a lower resilient hitch linkage pivotally connected at one end thereof to said implement and adapted to be pivotally connected at an opposite end thereof to the towing apparatus, said upper and said lower resilient hitch linkages each being adapted to minimize the transmission of impact or shock loads and/or vibrations between said ground working implement and the towing apparatus, each of said hitch linkages comprising a front link member adapted to be pivotally connected at a first pivot point to the towing apparatus, and a rear link member pivotally connected at a second pivot point to said ground working implement, said upper and said lower hitch linkages each comprising a first clamp member mounted on one of said pivoted link members and a bearing member mounted on the other of said pivoted link members, each of said first clamp members being positioned contiguous and in facing but spaced relation to first surface means of said bearing member of the respective hitch linkage, a corresponding second clamp member positioned contiguous and in facing but spaced relation to second surface means of said bearing member of each respective hitch linkage, said first and said second surface means of each respective




bearing member being located substantially opposite each other on the respective bearing member, each of said first and said second clamp members of each hitch linkage being contoured to receive separate resilient cushioning means, separate resilient cushioning means received by each of said clamp members, said first and said second clamp members of each respective hitch linkage being secured to each other to confine the corresponding resilient cushioning means under pressure between said first surface means and said first clamp member of each respective hitch linkage and between said second surface means and said second clamp member of each respective hitch linkage and thus whereby to define a resilient connection between said front and said rear pivoted link members of each respective hitch linkage.

---

## 4,147,377
## SKI

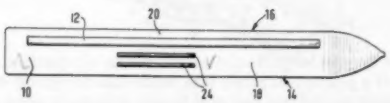
**Hans-Joachim Plenk, Ruhpolding, Fed. Rep. of Germany, assignor to Jochen Plen, KG, Ruhpolding, Fed. Rep. of Germany**

**Filed Dec. 23, 1976, Ser. No. 753,696**

**Claims priority, application Fed. Rep. of Germany, Dec. 29, 1975, 2558939**

**Int. Cl.[2] A63C *5/04***

**U.S. Cl. 280—609** **21 Claims**

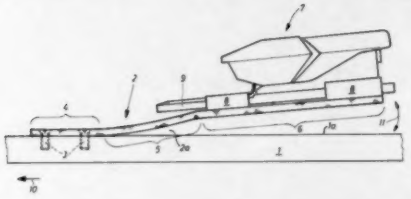



1. A ski comprising an elongate body having an upper surface and a running surface, a longitudinal guide groove dividing said running surface of the ski into an inner longitudinal zone and an outer longitudinal zone, at least one additional longitudinal groove formed in the running surface of the ski spaced from the guide groove in one of said zones, said at least one additional groove having no counterpart in the other of said zones whereby said running surface is unsymmetrical with respect to the longitudinal axis of the ski so that a skier wearing

the ski can shift his weight laterally fron one zone to the other and thereby change the sliding characteristics of the ski.

---

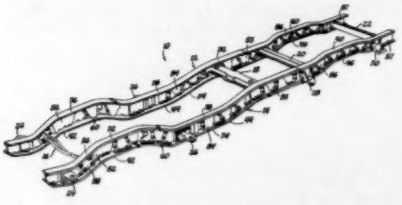
**4,147,378**
**DEVICE FOR USE WITH A SKI BINDING**
Kaspar Reich, Wattwil, Switzerland, assignor to Werner Herzig, Wattwil, Switzerland
Filed Apr. 1, 1977, Ser. No. 783,780
Claims priority, application Switzerland, Apr. 8, 1976, 4470/76
Int. Cl.[2] A63C *9/08*
U.S. Cl. 280—633 8 Claims



1. A device for use in conjunction with a ski binding for supporting a heel holder component at the ski, comprising:
compression spring means interposed between the heel holder component and the ski wherein the heel holder component is mounted on the spring means;
said spring means being supported with one end on the heel holder component and with the other end on the ski said spring means tending to push the heel holder component away from the ski;
said spring means allowing for a resilient movement of the heel holder component and the ski towards one another at least approximately at right angles to a plane containing the ski whereby in the start position of the ski binding, the ski and the heel holder component are provided with a space therebetween.

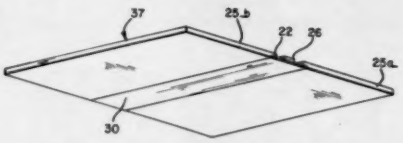
---

**4,147,379**
**VEHICLE FRAME**
Gerald R. Winslow, Troy, Mich., assignor to United States Steel Corporation, Pittsburgh, Pa.
Filed Jun. 27, 1977, Ser. No. 810,056
Int. Cl.[2] B60G *21/02*
U.S. Cl. 280—781 13 Claims



1. A vehicle frame assembly comprising: two generally parallel, elongated side rail members and a plurality of cross members connecting said side rail members; each of said side rail members including an upper plate member, a lower plate member and a web member between said upper and lower plate members, said web member including a plurality of primary web sections having a truncated-triangular shape located along the length of said side rail member, adjacent primary web sections being inverted and spaced laterally with respect to one another and intermediate web sections connecting adjacent primary web sections.

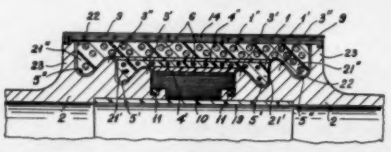
**4,147,380**
**CONTINUOUS FLEXIBLE HINGE FOR PAPERBOARD AND THE LIKE**
Douglas G. Nelson, Centerville, Ohio, assignor to The Mead Corporation, Dayton, Ohio
Filed Jun. 8, 1977, Ser. No. 804,787
Int. Cl.[2] B42D *3/06*
U.S. Cl. 281—29 15 Claims




14. A flexible hinge for paperboard and the like suitable for use in a book cover blank, comprising:
(a) a plurality of parallel portions of paperboard separated by a predetermined amount,
(b) means defining a groove of predetermined depth in said paperboard portions and extending across a part of each said portion in a direction parallel to the separation therebetween, all portions of said paperboard, including the parts having said groove therein, being substantially equally uncompressed, the grooved parts having less thickness and less paperboard material than the remainder of said portions, and
(c) a hinge tape adhered to the paperboard portions within said groove, said hinge tape being of substantially the same thickness as the depth of the groove and extending from one side thereof to the other to provide a substantially flush surface on the paperboard.

---

**4,147,381**
**PIPE COUPLING**
Walter Schwarz, Engerthstr. 237b, A-1020 Wien II, Austria
Filed Jul. 22, 1977, Ser. No. 818,321
Claims priority, application Austria, Jul. 23, 1976, 5452/76
Int. Cl.[2] F16L *11/12*
U.S. Cl. 285—53 14 Claims



1. In combination, a conduit with a terminal portion having a plurality of peripheral grooves bounded by peripheral ribs whose height decreases toward the free end of said terminal portion, and a coupling sleeve of filament-reinforced thermosetting resin overlappingly connecting said terminal portion with an external member, said coupling sleeve being radially subdivided into a plurality of relatively shiftable and thus independently deformable shells centered on the conduit axis and carrying inner peripheral beads respectively engaging in said peripheral grooves, said shells being of progressively increasing axial tensile strength from the innermost shell to the outermost shell.

4,147,382

## CONNECTING PIECE FOR A BRANCH DUCT TO A SUBSTANTIALLY ROUND AIR CONDITIONING DUCT

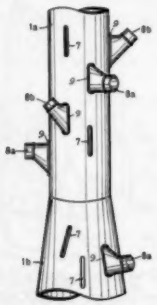
Erich Wachter, Zurich, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Feb. 2, 1977, Ser. No. 764,870

Claims priority, application Switzerland, Feb. 3, 1976, 1300/76

Int. Cl.[2] F16L *55/00*

U.S. Cl. 285—189 9 Claims



1. In combination

an air-conditioning duct having a substantially rounded cross-section and at least one slot-shaped opening extending longitudinally thereof;

a connecting piece having a flat-planar flange disposed about said opening of said duct and defining a slot-shaped opening aligned with said opening of said duct, said flange having an outer periphery disposed at all positions thereon substantially equidistantly from said duct directly therebeneath; and

means securing said connecting piece to said duct wherein each of said connecting flange and said slot-shaped opening in said duct have a width relative to the circumference of said duct that the curvature in the slot area of said duct can be ignored.

---

4,147,383

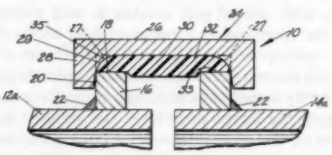
## PIPE COUPLING

James C. Schluter, c/o Armco Steel Corporation, 703 Curtis St., Middletown, Ohio

Filed Jan. 6, 1978, Ser. No. 867,309

Int. Cl.[2] F16L *21/06*

U.S. Cl. 285—373 10 Claims



1. A pipe joint comprising, in combination:

(a) two lengths of thin wall, pipe arranged end-to-end for connection one to the other but providing a gap therebetween to allow for longitudinal movement thereof, each of said pipe lengths having a continuous, circumferential, retainer ring thereon recessed from the juxtaposed ends for pipe end connection purposes to allow longitudinal movement of said pipe lengths at said pipe joint but limit the amount of angular movement of said pipe lengths to prevent leakage, each said retainer ring having an inside diameter substantially contiguous and continuously integral with the outside diameter of its respective pipe length and continuously secured thereto, said retainer rings being of substantially rectangular cross section, whereby to provide therewith a peripheral flat circumferential bearing surface thereon, a substantially radially extending circumferential shoulder facing away from said juxtaposed ends, and a substantially radially extending circumferential bearing surface facing toward said juxtaposed ends;

(b) coupling means overlying and engaging said retainer rings which is yieldable and flexible during installation and thereafter allows for rotational and lateral movement of said pipe lengths comprising at least one thin band of generally U-shaped cross section having a wide base portion and in-turned legs joining said pipe ends to allow for longitudinal movement of said pipe lengths, the legs of said band engaging said circumferential shoulders of said retainer rings, and the base of said bond having a width somewhat greater than the combined width of said two pipe retainer rings to be connected, said legs of said band when assembled having an inside diameter slightly greater than the outside diameter of said pipe and adapted to overlie same,

(c) gasket means so positioned as to form a seal between said retainer rings and said band;

(d) said band having a pair of free ends adapted to approach or substantially abut each other, one of said free ends being provided with a single lug having an aperture therethrough and the other of said free ends being provided with a pair of spaced lugs having aligned apertures therethrough, said single lug extending between said spaced pair of lugs with its respective aperture in substantial alignment with the aligned apertures of said spaced lugs when said free end approach or substantially abut each other;

(e) key means adapted to be snugly received within said apertures of said lugs when said free end approach or substantially abut each other;

whereby to secure said lugs together and tighten said coupling means about said retainer rings so as to provide a leak tight joint.

---

4,147,384

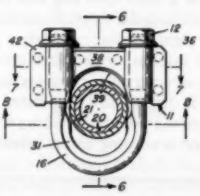
## U-BOLT CLAMP

John E. Heckethorn, Dyersburg, Tenn., assignor to Heckethorn Manufacturing Co., Dyersburg, Tenn.

Filed Jan. 12, 1978, Ser. No. 868,798

Int. Cl.[2] F16L *13/14*

U.S. Cl. 285—382.2 9 Claims



1. In a clamp for sealing and interlocking telescoped metal tubes or the like to each other, said clamp comprising a U-bolt having a pair of parallel, spaced legs, said legs having threaded ends, and a semicircular bight portion located between and interconnecting said legs, a saddle member having a pair of spaced tubular parallel housings adapted to receive said U-bolt legs, and nut means adapted to thread onto the ends of said legs to move said saddle member toward said bight portion, the improvement comprising said bight portion of the U-bolt being provided on its inner face between said legs with contact means extending for more than 180° and extending inwardly towards the bight center and adapted to contact the outer of said telescoped metal tubes, said saddle being formed of a pair of substantially identical planar sheet metal webs welded to-

gether in face-to-face contact and having an arcuate cut-out portion of less than 180° extending between said housings, the ends of the cut-out portion being chamfered outwardly to provide a large mouth opening, wherein a pair of metal tubes having an outside diameter that is greater than the inside diameter of the clamp when completely tightened about the telescoped tubes may be received by virtue of the opening between the U-bolt legs and the chamfered ends of the cut-out portion, said cut-out portion having means thereon cooperating with said contact means when the clamp is in its completely tightened condition to provide a continuous uniform circumferential bead on said telescoped tubes.

---

**4,147,385**

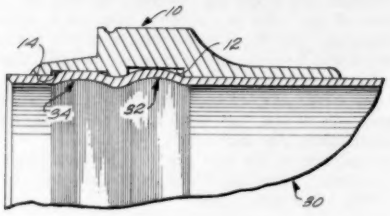
## COUPLING SLEEVE

**Johannes H. van der Velden, Seattle, Wash., assignor to The Boeing Company, Seattle, Wash.**

**Continuation-in-part of Ser. No. 476,854, Jun. 6, 1974, abandoned. This application Nov. 4, 1975, Ser. No. 628,664**

**Int. Cl.[2] F16L *13/14***

**U.S. Cl. 285—382.4** **7 Claims**




1. A coupling sleeve for swaged attachment to thin wall tubing consisting essentially of

a cylindrical body having a tube end, a body end, and an inner peripheral wall, said inner peripheral wall having a first diameter,

a first annular right circular cylindrical groove located in the inner wall adjacent the tube end of the sleeve having a second diameter greater than said first diameter, said first groove being rectangular in cross-section;

a second annular right circular cylindrical groove located in the inner wall interior of the first groove, said second groove having a rectangular cross-section and in addition having a width dimension (W) related to the thickness dimension (T) of the wall of the tubing to which the sleeve is to be attached according to the relationships:

| T | W |
|---|---|
| .016 in. | .115 1n. |
| .020 in. | .115 in. |
| .020 in. | .125 in. |
| .026 in. | .130 in. |
| .033 in. | .142 in. |
| .039 in. | .135 in. |
| .052 in. | .135 in. |

and the ratio of W/T is maintained such that the ratio is equal to or greater than 2.2; and

an annular right circular land located in the inner wall of the body separating said first and second annular grooves having a width dimension which is equal to or greater than ¼ of the width of the second groove and a diameter equal to the diameter of the inner peripheral wall of the cylindrical body.

**4,147,386**

## MOTOR VEHICLE SEAT

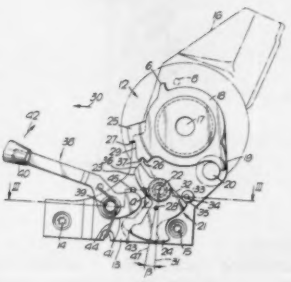
**Richard Stolper, Ginsheim-Gustavsburg, Fed. Rep. of Germany, assignor to General Motors Corporation, Detroit, Mich.**

**Filed Nov. 25, 1977, Ser. No. 854,801**

**Claims priority, application Fed. Rep. of Germany, Dec. 8, 1976, 2655535**

**Int. Cl.[2] A47C *1/025*; B60N *1/04***

**U.S. Cl. 297—362** **3 Claims**

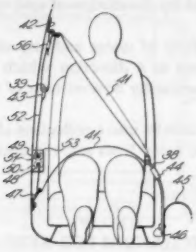


1. A motor vehicle seat comprising a seat portion, a tiltable back-rest, and a pivotal hinge fitting pivotally securing said back-rest to said seat portion, said pivotal hinge fitting comprising a fixed component connected to said seat portion, a pivotable component connected to said back-rest, a pivot pin connecting said fixed component to said pivotable component, a toothed part having notches formed in the periphery thereof, rotatably mounted on said pivot pin, fine-adjustment means on said pivotable component engageable with said toothed part and operable to pivot said pivotable component gradually about said pivot pin, means on said fixed component to limit the rotational movement of said toothed part in a direction corresponding to a pivotal movement of the back-rest away from the seat portion, an inertia pawl pivotally mounted on said fixed component and engageable, when subjected to inertia forces of predetermined magnitude in a predetermined direction, with one of said notches in said toothed part to prevent the rotational movement of said toothed part in a direction corresponding to a pivotal movement of the back-rest towards the seat portion, a manually-operable pawl-release lever pivotally mounted on said fixed component and operable to disengage the inertia pawl from said toothed part, spring-bias means on said pawl-release lever biasing said lever against movement in a direction to disengage said inertia pawl, stop means positioned relative to the pivot point of the inertia pawl so that the inertia pawl, when disengaged from said toothed part, rests against said stop means with the centre of gravity of the inertia pawl at an angle of about 10° in front of a vertical axis extending through the pivot point of the inertia pawl, manual adjustment means for said stop means operable to engage the inertia pawl with one of said notches in said toothed part, and fine-adjustment limit means to prevent the pivotal movement of the back-rest towards the seat portion by the operation of said fine-adjustment means exceeding a point at which the centre of gravity of the back-rest reaches a predetermined angle to a vertical axis extending through the pivot pin of said hinge fitting.

## 4,147,387
## SAFETY BELT

Michel J. W. Coenan, The Hague, Netherlands, assignor to Coenen Benelux B.V., Netherlands

Filed Apr. 12, 1977, Ser. No. 786,904
Claims priority, application United Kingdom, Apr. 26, 1976, 16764/76
Int. Cl.[2] A62B *35/00*
U.S. Cl. 297—388 27 Claims



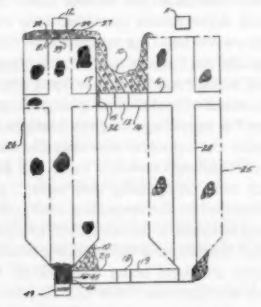
1. A safety belt comprising a length of webbing having a first end portion, an intermediate portion and a second end portion, said intermediate portion providing lap and diagonal parts of said safety belt, said lap part being provided for restraining the major body weight of a seat occupant and said diagonal part being provided for restraining the upper torso of said occupant, said first end portion being coupled to said second end portion such that as said first end portion is paid out, said second end portion is taken up and vice versa, the rate of take up and pay out of said first end portion being different from the rate of pay out and take up said second portion, whereby during an accident, said rates of pay out and take up of said end portions cooperate with the loads applied to said lap and diagonal parts to restrain said occupant in a substantially upright seated posture during deceleration.

---

## 4,147,388
## METHOD FOR IN SITU RECOVERY OF LIQUID AND GASEOUS PRODUCTS FROM OIL SHALE DEPOSITS

Gordon B. French, Bakersfield, Calif., assignor to Occidental Oil Shale, Inc., Grand Junction, Colo.

Continuation of Ser. No. 716,583, Aug. 23, 1976, abandoned, which is a continuation-in-part of Ser. No. 505,363, Sep. 12, 1974, abandoned. This application Jan. 5, 1978, Ser. No. 867,090
Int. Cl.[2] E21B *43/24;* E21C *41/10*
U.S. Cl. 299—2 33 Claims



9. A method for recovering liquid and gaseous products from an in situ oil shale retort containing a fragmented permeable mass of particles containing oil shale in a subterranean oil shale deposit comprising the steps of:

forming a tunnel at a level above the top of the retort leaving unfragmented deposit between the tunnel and the top of the fragmented mass in the retort;

forming at least one sloping gas inlet passage from the tunnel to the top of the retort;

introducing a gas into the top of the retort through such a sloping passage for retorting liquid and gaseous products from oil shale in the fragmented mass; and

removing the liquid and gaseous products from the bottom of the retort.

33. A method for retorting oil shale in an in situ oil shale retort containing a fragmented permeable mass of particles containing oil shale in a subterranean oil shale deposit, comprising the steps of:

forming a tunnel at a level above the top of the retort leaving unfragmented formation between the tunnal and the top of the fragmented mass in the retort;

forming a plurality of gas inlet passages from the tunnel to distributed locations at the top of the retort;

introducing oxygen-supplying gas through such a plurality of gas inlet passages for sustaining the combustion zone and advancing the combustion zone through the fragmented mass; and

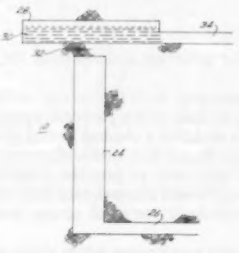
selectively adjusting the rate of introduction of oxygen-supplying gas through such gas inlet passages to such distributed locations for equalizing flow along various paths in the fragmented mass in the retort.

---

## 4,147,389
## METHOD FOR ESTABLISHING A COMBUSTION ZONE IN AN IN SITU OIL SHALE RETORT

William J. Bartel, Grand Junction, Colo.; Chang Y. Cha, Bakersfield, Calif., and Robert S. Burton, III, Grand Junction, Colo., assignors to Occidental Oil Shale, Inc., Grand Junction, Colo.

Continuation-in-part of Ser. No. 770,860, Feb. 22, 1977, abandoned, which is a continuation of Ser. No. 492,767, Jul. 29, 1974, abandoned. This application Jun. 27, 1977, Ser. No. 810,491
Int. Cl.[2] E21B *43/24, 43/26*
U.S. Cl. 299—2 39 Claims



1. A method for retorting oil shale in an in situ oil shale retort in a subterranean formation containing oil shale, such a retort containing a fragmented permeable mass of formation particles containing oil shale, comprising the steps of:

excavating a void in the subterranean formation within the boundaries of an in situ oil shale retort to be formed in the subterranean formation;

placing combustible material in the void in the subterranean formation, the combustible material being placed adjacent an ignition situs;

explosively expanding formation toward the void to form an in situ oil shale retort containing a fragmented permeable mass of formation particles containing oil shale, at least a portion of the fragmented mass adjacent an ignition situs containing such combustible material; and

igniting such combustible material for establishing a combustion zone adjacent the ignition situs and retorting oil shale in the in situ oil shale retort.

9. A subterranean formation containing oil shale in an intermediate stage of preparation for in situ recovery of liquid and gaseous hydrocarbons from the oil shale comprising:

a chamber in the subterranean formation located at the top boundary of an in situ oil shale retort to be formed in the subterranean formation;

a zone of unfragmented formation containing oil shale below the chamber;

fragmented material comprising combustible material in the chamber adjacent an ignition situs; and

means for explosively expanding unfragmented formation adjacent the chamber toward the chamber to form an in situ oil shale retort containing a fragmented permeable mass of formation particles containing oil shale wherein at least a portion of the fragmented mass adjacent such an ignition situs contains such combustible material.

---

**4,147,390**

## NODULE DREDGING APPARATUS AND PROCESS

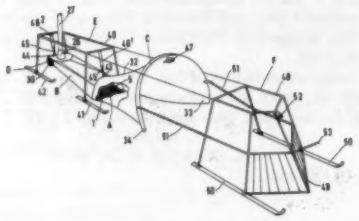
**Jacques Deliege; Michel Giot; Vsevolod Obolensky, all of Brussels; Luc Deconinck, Ieper, and Marc Lejeune, Ottignies-Louvain-la-Neuve, all of Belgium, assignors to Union Miniere S.A., Brussels, Belgium**

**Continuation-in-part of Ser. No. 808,838, Jun. 22, 1977, abandoned, which is a continuation of Ser. No. 712,115, Aug. 5, 1976, abandoned. This application Jan. 30, 1978, Ser. No. 873,744**

**Claims priority, application Luxembourg, Aug. 6, 1975, 73155**

**Int. Cl.² E02F *3/94***

**U.S. Cl. 299—8** **61 Claims**



53. Process for gathering nodules from the sea bed, which includes:

providing apparatus including water acceleration means comprising an inlet with wall means extending rearwardly of said inlet to define a channel having its bottom open to and adjacent the sea bed, said wall means coverging rearwardly of said inlet to provide progressively reduced cross-sections in said channel, said inlet and cross-sections all being sufficiently large to accept nodules of desired size;

transporting said acceleration means along the surface of the sea bed for generating therein a generally horizontal and longitudinal progressively accelerating flow of water whose velocity exceeds the rate of transport of said apparatus over the sea bed;

mechanically lifting nodules from the sea bed and directing the nodules upwardly to a predetermined elevation into said flow rearwardly of said acceleration means inlet in a region extending transversely of said flow across the lower portion of said channel;

introducing said flow, nodules and at least a portion of any silt that may be associated with said nodules into duct means having an entry connected with said acceleration means and including confining means defining a path for nodules received from said lifting means and extending downstream of said lifting means to a duct outlet, said confining means extending generally longitudinally above, below and to each side of said path, an inclined surface of said duct means having a generally horizontal transverse leading edge and a downstream end and extending upwardly and rearwardly relative to said leading edge; and silt discharge means comprising openings extending through said inclined surface between said entry and outlet,

continuing said flow along said duct means while discharging from the duct, through said openings, any silt dislodged from said nodules during said flow;

driving said nodules from said lifting means to the highest point of said inclined surface with the accelerated flow of water generated by the motion of said apparatus through the water;

establishing the flow of water and any silt which may be dispersed therein in a direction which will project upwardly and rearwardly downstream of said inclined surface; and

introducing said nodules into a collection chamber having an entrance turned away from said direction of flow.

---

**4,147,391**

## SWIVEL MECHANISM FOR KERF-CUTTING MACHINES

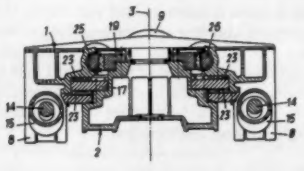
**Gottfried Siebenhofer, Vienna; Manfred Mulner, and Walter Arbeithuber, both of Zeltweg, all of Austria, assignors to Vereinigte Osterreichische Eisen- und Stahlwerke - Alpine Montan Aktiengesellschaft, Vienna, Austria**

**Filed Nov. 22, 1977, Ser. No. 854,025**

**Claims priority, application Austria, Dec. 1, 1976, 8903/76**

**Int. Cl.² E21C *31/10***

**U.S. Cl. 299—75** **3 Claims**

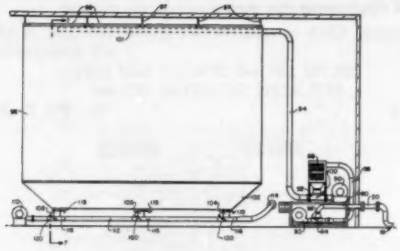


1. A swivel mechanism for kerf-cutting machines of the kind comprising a frame, a cutting tool, a cutter arm carrying the cutting tool and pivoted to a swivel head on a horizontal axis for vertical angular movement, said swivel head being pivoted on an approximately vertical axis to a bearing disc which is rigidly connected to the frame of the cutting machine and has an outer annular zone that is engaged on both sides by sliding surfaces of the swivel head, and swivel drive means for imparting angular movements to the swivel head, characterized in that the swivel drive means comprise two racks which are mounted in the swivel head for movement in mutually opposite directions parallel to the vertical center plane of the cutter arm, each rack being connected to at least one piston member of a hydraulic actuator and each working chamber adjoining a piston member for actuating one rack being in hydraulic communication with the opposite working chamber adjoined by the piston for actuating the other rack, the piston means for actuating each rack comprising two coaxial piston members which are connected by the respective rack, each of said piston members being adapted to be subjected to hydraulic pressure only at one end thereof, and the working chambers associated with said piston members being adjoined by those end faces thereof which are remoted from the respective rack, and a pinion connected to and coaxial with the bearing disc and in mesh with said racks at diametrically opposite points of said pinion, the outside diameter of the bearing disc exceeding the pitch diameter of the pinion and the bearing disc and the pinion being annular and screw-connected to a pedestal which is rigidly connected to the frame of the cutting machine.

## 4,147,392
## VEHICULAR TRANSPORT AND CONVEYANCE SYSTEM

Gunter G. Fuss, San Carlos, Calif., assignor to Free-Flow Packaging Corporation, Redwood City, Calif.

Filed Jun. 30, 1977, Ser. No. 811,973
Int. Cl.[2] B65G *53/40*
U.S. Cl. 302—52 4 Claims



1. In a system for pneumatic conveyance of light-weight subdivided materials from a source of supply to a point of end use, said system being adapted for use with vehicular means having a discharge conduit for discharge of lightweight subdivided materials, the combination of stationary conveyance means for lightweight subdivided materials including a relatively large volume storage container for said lightweight subdivided material, said storage container being in the form of a large flexible perforated bag having an inverted U-shaped duct means positioned adjacent the top thereof, supply conduit means adapted to interconnect in fluid communication with the discharge conduit means of said vehicular means, venturi means positioned in said supply conduit means, blower means associated with said venturi means to effect delivery of said lightweight subdivided material from said vehicular discharge conduit means to said relatively large storage container, said U-shaped duct means forming a terminal portion of the supply conduit means of said stationary conveyance means within said relatively large volume storage container, a plurality of storage container discharge means arranged adjacent and in spaced relation to a discharge zone in said relatively large storage container, and selectively operable slide means in each of said storage container discharge means to effect a rapid and progressive discharge of the contents of said storage container for conveyance to one or more preselected distribution outlets provided at various locations in said stationary conveyance means.

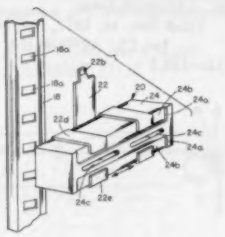
---

## 4,147,393
## DRAWER SLIDE MOUNT EMPLOYING A SLIDE ELEMENT AND COOPERATIVE CLIP

Larry J. Nelson, Belmont, and John E. Fortuna, II, Cedar Springs, both of Mich., assignors to Knape & Vogt Manufacturing Co., Grand Rapids, Mich.

Filed Dec. 16, 1977, Ser. No. 861,104
Int. Cl.[2] F16C *21/00*
U.S. Cl. 308—3.6 7 Claims

1. A drawer rail support assembly comprising:
slotted vertical standards having a plurality of vertically spaced slots therein;
a drawer rail support for each vertical standard, including a clip and a slide element;
said clip having projections for interfitting with said slots at a selected elevation and having portions defining a slide channel for said slide element;
said slide element having fastener receiving orifices for attachment of a drawer rail thereto;
said clip portions and slide element being arranged for securement of said slide element against sliding in said slide



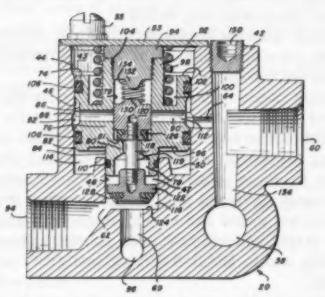
channel when the drawer rail is attached to said slide element.

---

## 4,147,394
## VEHICLE BRAKE SYSTEM

Boleslaw M. Klimek, Des Plaines, and Victor Mastis, Hinsdale, both of Ill., assignors to The Echlin Manufacturing Company, Branford, Conn.

Continuation of Ser. No. 660,141, Feb. 23, 1976, abandoned.
This application Jun. 27, 1977, Ser. No. 810,116
Int. Cl.[2] B60T *8/04*
U.S. Cl. 303—118 23 Claims

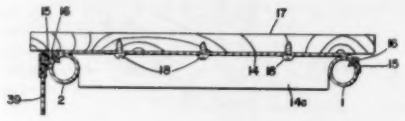


11. Apparatus comprising:
a housing, including a cavity formed by walls therein and first, second, third and fourth ports; and
piston means mounted within said housing, said piston means cooperating with said walls forming said cavity to define at least a first and a second chamber within said cavity, said first chamber being in communication with said first port, and said second chamber being in communication with said second and third ports, said piston means mounted for reciprocal movement within said housing, responsive to pressure in said first chamber, between first and second positions, said piston means including shuttle valve means mounted at least partially within said piston means and movable within said piston means in response to movement of said piston means to selectively provide communication between said fourth port and said second chamber and to selectively terminate communication of said second port with said second chamber.

## 4,147,395
## BAR CONSTRUCTION

Allen W. Gale, Rocky River, Ohio, assignor to Production Experts, Inc., Cleveland, Ohio

Filed Nov. 14, 1977, Ser. No. 850,954
Int. Cl.[2] A47B *96/14, 96/18*
U.S. Cl. 312—140.2 2 Claims



1. A rigid, light, portable, and easily assembled multiple frame bar structure made up mostly of tubular members, said bar structure comprising:

(a) horizontally extending straight tubular members;

(b) vertically extending straight tubular members;

(c) a bar top

(d) a bar shelf;

(e) straight vertical tubular interconnecting means of a lesser diameter than said vertically extending straight tubular members interconnecting said vertically extending straight tubular members by sliding into said vertically extending straight tubular members;

(f) horizontally extending curved tubular connecting members, said horizontally extending curved tubular connecting members having a greater diameter than said horizontally extending straight tubular members so as to slidably engage said horizontally extending straight tubular members, and said horizontally extending curved tubular members having attaching means fixedly securing said horizontally extending straight tubular members, in addition, said horizontally extending curved tubular members having vertical receiving means receiving said straight vertical tubular interconnecting means;

(g) vertical securing means securing said straight vertical tubular interconnecting means to said horizontally extending curved tubular members;

(h) bracket means including a flat plate having arcuately curved ends for embracing said horizontally extending straight tubular members, said bracket means additionally having a vertical downwardly extending flange, said flange having a substantial vertical width relative to its horizontal width and said flange extending the length of the bracket means and serving to maintain said horizontally extending straight tubular members in spaced relationship and in addition serving to rigidify said bracket means;

(i) bracket attaching means for securing said bracket means in removably fixed relationship to said horizontally extending straight tubular members; and

(j) attaching means for removably attaching said bar top to said bracket means which are secured to an upper said frame of the bar, and said bar shelf to said bracket means which are secured to a lower said frame of the bar.

---

## 4,147,396
## HIGH SPEED ROTOR SYSTEM

Joseph Lyman, Kennebunk, Me., assignor to Cambridge Thermionic Corporation, Cambridge, Mass.

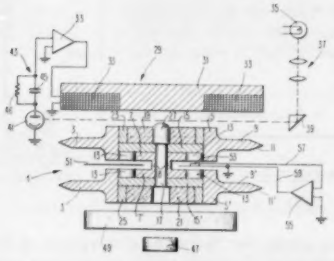
Filed Feb. 22, 1977, Ser. No. 770,531
Int. Cl.[2] F16C *39/00*
U.S. Cl. 308—10 11 Claims

1. In a magnetically suspended high speed rotor system comprising a rotor assembly and electric motor means for producing rotation of said rotor about an axis thereof,

(a) electromagnetic means disposed near one end of said rotor, said means being energizable in response to electric current supplied thereto to exert an attractive force on said rotor to support it,

(b) a first permanent magnet affixed to said rotor near the opposite end thereof, said magnet being polarized in a direction substantially parallel to said axis of rotation,

(c) a second permanent magnet disposed in juxtaposition to said first magnet, said second magnet being polarized so as to cooperate with said first magnet and exert an attractive force on said rotor tending to oppose the force exerted by said electromagnetic means,



(d) means responsive to displacement of said rotor in the direction of its axis of rotation for controlling the current supplied to said electromagnetic means so as to tend to restore said rotor to its position prior to such displacement, and

(e) a conductive element positioned between said first and second permanent magnets so as to have eddy currents induced therein upon the occurrence of any nutation of said opposite end of said rotor relative to said second permanent magnet, whereby said nutation is effectively damped.

---

## 4,147,397
## ELECTRICAL ASSEMBLY IN COMBINATION WITH PRINTED CIRCUIT BOARD

James Iantorno, Mamaroneck, N.Y., assignor to Sealectro Corporation, Mamaroneck, N.Y.

Division of Ser. No. 782,041, Mar. 28, 1972, abandoned. This application Mar. 17, 1978, Ser. No. 887,603
Int. Cl.[2] H01R *11/08;* H05K *1/08*
U.S. Cl. 339—17 C 6 Claims

1. An electrical assembly comprising in combination a printed circuit board having a contact aperture and a connector disposed within said contact aperture, said connector including a conductive, wire formed helix, said wire being resilient and having a substantially square cross section, one end of said helix being opened for receiving a wire lead, said helix tapering from said open end to the opposite end thereof, thus defining successive coils of progressively decreasing diameter, said helix being wound such that the edges of the square wire provide the helix with an external thread for engaging the contact aperture of said printed circuit board and retaining the connector therein, said edges further providing said connector

with an internal thread for engaging said wire lead for retaining said wire lead in said connector.

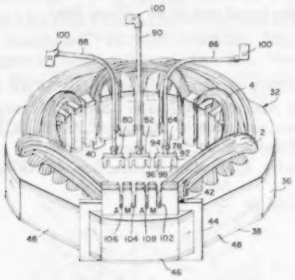
---

4,147,398

## SELECTIVE ELECTRICAL CONNECTIONS AMONG WIRES OF DIFFERENT DIAMETERS

John F. Lill, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Mar. 17, 1978, Ser. No. 887,585
Int. Cl.[2] H01R 9/08; H02K 3/50
U.S. Cl. 339—98 6 Claims



1. Electrical connecting means for connecting a first electrical lead to one end of a first wire, for connecting a second electrical lead to one end of a second wire and for commonly connecting the other ends of said first and second wires to a third electrical lead, said wire being of a relatively coarse gage, said second wire being of a relatively finer gage than said first wire, said connecting means comprising:

insulating housing means having first, second, and third terminal-receiving cavities therein,

a first wire-admitting slot means in said housing communicating with said first cavity, a second wire-admitting slot means in said housing communicating with said second cavity, and third wire-admitting slot means communicating with said third cavity, said third wire-admitting slot means comprising two side-by-side slot means, said first and second wire-admitting slot means each comprising a single wire-admitting slot means adapted to receive a single wire,

first, second and third terminals, each of said terminals comprising a plate-like section having first and second side-by-side wire-receiving slots extending therein from one end thereof, said first slot being dimensioned to receive, and establish electrical contact with. said first wire, said second slot being dimensioned to receive, and establish electrical contact with, said second wire,

said first wire-admitting slot means being dimensioned to admit said first wire, said second wire-admitting slot means being dimensioned to admit said second wire and to refuse admittance to said first wire, one of said slot means of said third wire-admitting slot means being dimensioned to admit said first wire and the other slot means being dimensioned to admit said second wire and to refuse admittance to said first wire whereby,

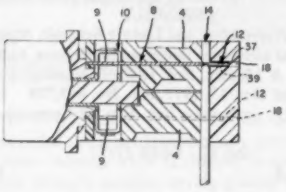
upon locating said one end of said first wire in said first wire-admitting slot means, locating said one end of said second wire in said second wire-admitting slot means, locating the other ends of said first and second wires in said third wire-admitting slot means and thereafter inserting said first, second, and third terminals into said first, second and third cavities respectively, the ends of said wires will be connected to said terminals.

4,147,399

## FLAT CABLE CONNECTOR ASSEMBLY

Jessie L. Moser, High Point, and John R. Shoemaker, Reidsville, both of N.C., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Feb. 1, 1978, Ser. No. 874,284
Int. Cl.[2] H01R 13/38
U.S. Cl. 339—99 R 4 Claims



1. A connector assembly for flat cable, comprising:

a connector housing having a mating side and first and second rows of electrical terminals each having a pair of slotted plate portions separated by a space,

first and second rows of coplanar metal strip circuit traces mounted in corresponding first and second dielectric straps,

said straps being mounted to said connector over said first and second rows of contacts,

each said circuit traces having first and second narrow waist sections wedgingly engaged in said slotted plate portions,

each said strip circuit traces having a relatively wide section integral with and disposed between said first and second narrow waist sections and received in the spaces between said plate portions,

said strip circuit traces having first and second rows of integral slotted plate contacts having piercing edges,

a flat cable having an insulation jacket pierced by said first and second rows of slotted plate contacts, and

said flat cable having conductors electrically connected in said slotted plate contacts, and

means covering said cable and latched to said first and second straps.

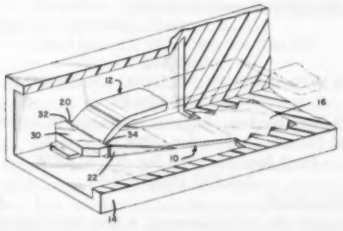
---

4,147,400

## CONTACT RETENTION DEVICE

Clair W. Snyder, Jr., Hellam; Clarence L. Paullus, Lewisberry, and Paul B. Derr, Middletown, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Feb. 21, 1978, Ser. No. 879,576
Int. Cl.[2] H01R 13/40
U.S. Cl. 339—217 S 3 Claims



1. A contact retention device for use in combination with an electrical connector housing and a blade-like electrical contact received therein, said device comprising:

a cantilever spring member having a first end fixedly secured in said housing, a profiled release tab on the free end of said member and a pair of latching ears projecting from one surface of said member spaced from said release tab,

said latching ears being adapted to engage with shoulders of said contact and said release tab projecting beyond the end of said contact whereby the contact is retained in said housing by engagement of said ears with said shoulders and said contact is released simply by depressing the release tab to disengage said latches from said shoulders.

---

**4,147,401**

## POLYGONAL MIRROR HOLDER AND DRIVE ASSEMBLY

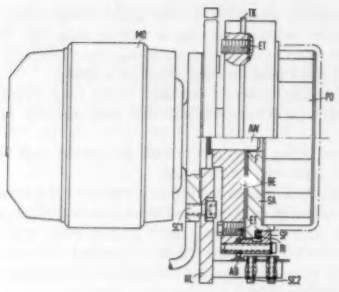
**Helmut Reichl, Herrsching, and Ludwig Schmidt, Munich, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany**

**Filed Oct. 13, 1977, Ser. No. 841,799**

**Claims priority, application Fed. Rep. of Germany, Apr. 19, 1977, 2717299**

**Int. Cl.[2] G02B *27/17***

**U.S. Cl. 350—6.8** **15 Claims**



1. A device for holding and driving a polygonal mirror with which the polygonal mirror is adjustable such that deviations of the drive from true running can be compensated for comprising; a disc member rigidly connected to a driving shaft of a drive means, a plurality of adjusting means carried by the disc having axial ends projecting from an axial end face of the disc and at least some of the means being adjustable relative to the disc, a mirror housing holding the polygonal mirror, the mirror housing positioned on the drive shaft adjacent the disc, means resiliently loading the mirror housing against the ends of adjusting means of the disc, the mirror housing being tiltable relative to the driving shaft whereby the attitude of the mirror housing relative to the driving shaft is adjustable by means of the adjusting means, the mirror housing having a central axial bore extending therethrough for receipt of the driving shaft, the bore having a short reduced diameter axial shaft contacting surface allowing the mirror housing to tilt on the drive shaft while remaining concentric therewith.

---

**4,147,402**

## PROCESS FOR MANUFACTURING AN OPTICAL FIBER TERMINATION

**Martin Chown, Harlow, England, assignor to International Standard Electric Corporation, New York, N.Y.**

**Filed Jun. 30, 1977, Ser. No. 811,575**

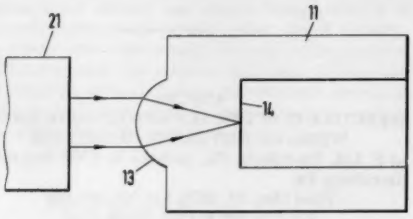
**Int. Cl.[2] G02B *5/14***

**U.S. Cl. 350—96.18** **4 Claims**

1. A process for manufacturing a lens termination for an optical fiber comprising the steps of:

providing a plastic preform comprising a tube member with a coaxial bore and having one end closed by a lens, said bore and lens being arranged such that the focal plane of said lens lies just below the surface of the base of said bore; and

directing light from a laser through said lens so as to focus the light onto said base of said bore thus evaporating a portion of the plastic material to form a cavity in said base opening to said surface and of a diameter less than that of




said bore, said cavity thus formed being dimensioned to receive the bared end of an optical fiber.

---

**4,147,403**

## POSITIONING SUBSTRATE FOR OPTICAL FIBRES

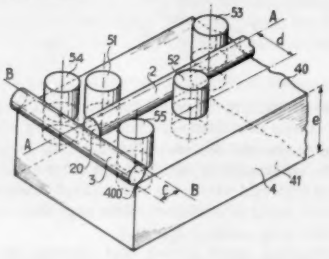
**Luigi d'Auria; André Jacques, and Chantal Moronvalle, all of Paris, France, assignors to Thomson-CSF, Paris, France**

**Filed Sep. 21, 1977, Ser. No. 835,209**

**Claims priority, application France, Sep. 24, 1976, 76 28767**

**Int. Cl.[2] G02B *5/14***

**U.S. Cl. 350—96.18** **7 Claims**




1. A positioning substrate for arranging the end of at least one optical transmission fibre in a reference plane and in parallel orientation to a given direction of said plane, comprising a flat surface for defining said reference plane, and at least three positioning dowels for defining said direction; said dowels having the form of cylinders of circular cross-section and of axes perpendicular to said flat surface; a first, a second and a third generatrix of said transmission fibre being respectively in contact with said flat surface, two of said dowels and a third of said dowels, said second and third generatrices being diametrically opposite.

---

**4,147,404**

## DIELECTRIC OPTICAL WAVEGUIDE JOINTS

**Paul C. Hensel, Woodbridge, England, assignor to The Post Office, London, England**

**Continuation of Ser. No. 703,227, Jul. 7, 1976, abandoned. This application Feb. 2, 1978, Ser. No. 874,694**

**Claims priority, application United Kingdom, Aug. 14, 1975, 33925/75**

**Int. Cl.[2] G02B *5/14***

**U.S. Cl. 350—96.21** **8 Claims**

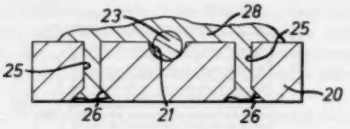
1. A dielectric optical wave-guide joint comprising:

a plate of non-ductile material having a groove disposed on a first face thereof and at least one cavity in said plate opening through said first face and having at least a portion which is undercut with respect to said face;

first and second dielectric optical wave-guides located in said groove in axial alignment and with their ends abutting;

a mass of ductile material which has been simultaneously

pressure-formed into intimate contact with said waveguides and into rigid attachment with said plate filling said




cavity, said mass being the sole means for retaining said wave-guides in axially aligned abutting relationship and in said groove.

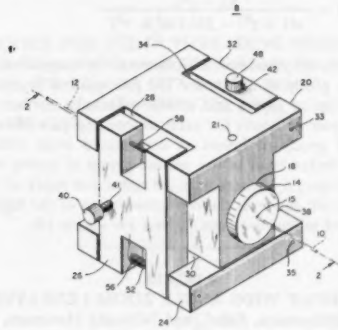
---

**4,147,405**

## APPARATUS FOR ALIGNING ARTICLES

**Carroll D. Spainhour, Princeton Township, Mercer County, N.J., assignor to Western Electric Co., Inc., New York, N.Y.**

**Filed Nov. 28, 1977, Ser. No. 855,483**
**Int. Cl.[2] G02B *5/14*; B23Q *3/00***
**U.S. Cl. 350—96.21** **15 Claims**



1. An apparatus for aligning a pair of articles comprising:
(a) a first member for holding a first article;
(b) a second member for holding a second article;
(c) hinge means, having a first end hingeably connected to a first end of said first member and having a second end hingeably connected to a first end of said second member, for connecting said first member to said second member such that said first member may pivot about the first and second ends of said hinge means so as to enable relative motion to occur between said first and second members;
(d) first adjustment means for pivoting the first member relative to said second end of the hinge means so as to provide selective arcuate movement of the first article relative to the second article along a first arcuate path; and
(e) second adjustment means for pivoting said first member relative to said first end of the hinge means so as to provide selective arcuate movement of the first article relative to the second article along a second arcuate path intersecting said first arcuate path.

---

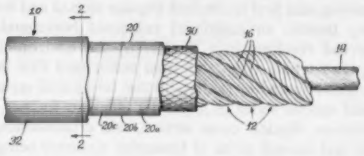
**4,147,406**

## FIBER OPTIC CABLE

**Gene S. Anderson, Batavia, Ill., assignor to Belden Corporation, Geneva, Ill.**

**Filed Oct. 26, 1976, Ser. No. 735,402**
**Int. Cl.[2] G02B *5/14***
**U.S. Cl. 350—96.23** **5 Claims**

1. A flexible fiber optic cable comprising an elongate strength member, at least one fiber optic element carried by said elongate strength member and helically cabled along the length of said elongate strength member to establish a fiber optic core, and a protective nonmetallic tubular shield layer disposed coaxially along the length of said fiber optic core, said tubular shield layer consisting of a spirally cut integral continuous length axially homogeneous tube of high impact resistant nonmetallic material of uniform transverse cross-sectional area throughout its length spirally wound about said fiber optic core with adjacent helical convolutions in contacting relation when the axis of said cable is straight, said tubular shield being



of sufficient radial strength to substantially prevent crushing of said fiber optic elements while facilitating flexing of the cable, said elongate strength member having greater tensile strength and lower elongation per unit length than said at least one fiber optic element so that the major portion of any axial load on said cable is substantially taken by said elongate strength member.

---

**4,147,407**

## COATINGS FOR FIBER WAVEGUIDES

**Bernard R. Eichenbaum, Lilburn, and William B. Gardner, Atlanta, both of Ga., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Continuation of Ser. No. 639,912, Dec. 11, 1975, abandoned.**
**This application Jan. 9, 1978, Ser. No. 868,043**
**Int. Cl.[2] G02B *5/14***
**U.S. Cl. 350—96.34** **3 Claims**

1. An optical fiber waveguide comprising an optical fiber and a protective coating covering the fiber comprising an ethylene vinyl acetate copolymer in which the vinyl acetate content is in the range of 10% to 25% of the copolymer, the elastic modulus of the polymer coating is in the range of 2–5 kg/mm$^2$ and the melt index of the copolymer is in the range of 200–500.

---

**4,147,408**

## BACK PROJECTION VIEWING SCREEN

**William T. Plummer, Concord, Mass., assignor to Polaroid Corporation, Cambridge, Mass.**

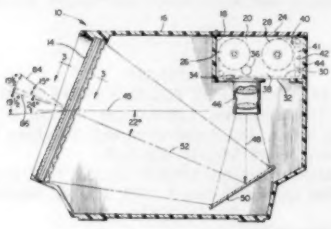
**Filed Dec. 23, 1976, Ser. No. 754,012**
**Int. Cl.[2] G03B *21/60***
**U.S. Cl. 350—128** **4 Claims**

1. A back projection screen for pictorially displaying upon the front face of said screen an image projected upon the back face of said screen, comprising:
a first light transmitting optically configured element having first and second faces, said first face comprising a circular Fresnel lens configured to substantially collimate the light rays defining the projected image and defining the back face of said screen, the surface of said Fresnel lens having a fine grain diffusing surface and said second face of said first light transmitting element comprising a first series of parallel lenticular elements configured to impart a first restricted horizontal angular spread to said projected image, said first series of lenticular elements having a circular cross section and a first periodicity; and
a second light transmitting optically configured element

having first and second faces and disposed in spaced parallel relationship with said first element, said first face of said second element facing said second face of said first element and comprising a second series of lenticular elements parallel to said lenticular elements of said second face of said first element, said second series of lenticular elements being configured to receive said projected image having said first horizontal angular spread and for imparting thereto an additional restricted horizontal angular spread resulting in a final restricted horizontal angular spread which is greater than either said first horizontal angular spread or said additional horizontal spread alone, said second series of lenticular elements further having a convex, eliptical cross section, said cross-sectional curve of said second series of lenticular elements being defined in accordance with the following equation:

$$y=78.211X^2+(1.5548\times10^5)X^4+(3.863\times10^8)X^6+(-2.24\times10^{12})X^8$$

where $-0.01064\leqq X\leqq+0.01064$



where X and Y are conventional rectangular coordinates, and said second series of lenticular elements having a second periodicity substantially lower than said first periodicity, and said second face of said second element defining the front face of the screen and comprising a third series of parallel lenticular elements extending substantially orthogonal to said first and second series of lenticular elements and configured to direct said projected image forwardly over a restricted vertical viewing zone, said third series of lenticular elements having a convex, eliptical cross section, said cross-sectional curve of said third series of lenticular elements being defined in accordance with the following equation:

$$y=68.306X^2-(1.5807\times10^5)X^4+(2.885\times10^8)X^6-(5.2\times10^{11})X^8$$

where $-0.00388\leqq X\leqq+0.00612$,
where x and y are conventional rectangular coordinates, and said third series of lenticular elements having a periodicity substantially the same as said second periodicity.

---

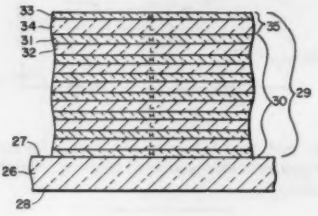
**4,147,409**

## LASER REFLECTOR WITH REDUCED ELECTRIC FIELD INTENSITY

**Joseph H. Apfel, Santa Rosa, Calif., assignor to Optical Coating Laboratory, Inc., Santa Rosa, Calif.**

**Filed Nov. 22, 1976, Ser. No. 744,198**
**Int. Cl.² G02B 5/28**
**U.S. Cl. 350—164** **4 Claims**

1. In a laser reflector for reflecting a laser beam, a substrate having a first optically smooth surface, a multilayer thin film optical coating disposed on said first surface, said coating being comprised of alternating high and low index layers formed in first and second groups of layers, the first group of layers being formed of alternate high and low index layers having optical thicknesses substantially equal to one quarter of the wave length of the laser beam to be reflected, the second group having optical thicknesses which are substantially different from one quarter of the wave length of the laser beam being reflected wherein $\theta$ the phase thickness of the low index layer is defined by the equation



$$\cos2\theta=\frac{f(1-r)^2+(1-fr)(r-f)\cos2\phi}{r(1-f)^2}$$

and $\phi$ is the phase thickness of the high index layer defined by the equation

$$\tan2\phi=\frac{v(1-f^2)}{u(1+f^2)-f(1+u^2+v^2)}$$

where r is the amplitude of reflectance at the outermost surface of the first group of layers for the first pair of layers in the second group of layers and at the outermost surface of the preceding pair of layers for each succeeding pair of layers in the second group of layers as determined from within the added low index layer of the second group of layers, where f is $(n_1-n_20/(n_1+n_2)$ where $n_1$ is the refractive index of the low index material, and $n_2$ is the refractive index of the high index material and where $u=r\cos2\theta$ and $v=-r\sin2\theta$.

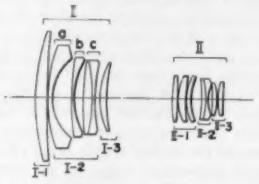
---

**4,147,410**

## TWO GROUP WIDE ANGLE ZOOM LENS SYSTEM

**Masaichi Shimomura, Sakai, and Mitsuaki Horimoto, Osaka, both of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Filed Nov. 4, 1977, Ser. No. 848,407**
**Claims priority, application Japan, Nov. 12, 1976, 51-136627**
**Int. Cl.² G02B 15/16**
**U.S. Cl. 350—184** **8 Claims**



1. A wide angle zoom lens system capable of providing a variable focal length by varying the relative position of at least two lens groups, comprising;

a first lens group of overall negative refractive power, $\phi_1$ including a first front lens component of a positive refractive power, $\Phi_{I\text{-}1}$, a second intermediate lens component of a negative refractive power, $\Phi_{I\text{-}2}$, located at the image side of the first lens component and a third rear lens component of a positive refractive power located at the image side of the second lens component, the second intermediate lens component further having a first lens sub-component of a refractive power, $\phi_1$, a second lens sub-component of a refractive power, $\phi_2$ located at the image side of the first lens sub-component and a third lens sub-component of a refractive power, $\phi_3$ located at the image side of the second sub-component, the respective absolute values

of the lens sub-components having the following relationship, $|\phi_1| > |\phi_2| > |\phi_3|$; and

a second lens group of overall positive refractive power, $\Phi_{II}$ located at the image side of the first lens group including a fourth front lens component of a positive refractive power, $\Phi_{II\text{-}1}$, a fifth intermediate lens component of a negative refractive power located at the image side of the fourth lens component and a sixth rear lens component of a positive refractive power located at the image side of the fifth lens component,

wherein the relationship of the respective refractive powers of the zoom lens system fulfills the following conditions:

$$1.1 \leqq |\Phi_{II}/\Phi_I| \leqq 1.5$$

$$0.1 \leqq |\Phi_{I\text{-}1}/\Phi_I| \leqq 0.5$$

$$0.3 \leqq |\phi_1/\Phi_{I\text{-}2}| \leqq 0.6$$

$$1.4 \leqq |\Phi_{II\text{-}1}/\Phi_{II}| \leqq 1.8$$

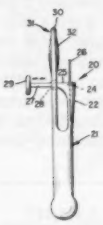
---

**4,147,411**

## DEVICE FOR USE IN THREADING NEEDLES

**Robert L. Barry, 416 Giovanni Dr., Nokomis, Fla. 33555**

**Filed Dec. 13, 1977, Ser. No. 860,064**
**Int. Cl.² G02B *7/04, 27/02***
**U.S. Cl. 350—240** **5 Claims**




1. A device for use in threading needles including a holder having a handle for manually supporting the device, said holder having an elongated socket for detachably receiving the pointed end of a needle for supporting the needle eye in an exposed position above the handle, said socket having a flared upper end for guiding the pointed end of the needle into the socket, a magnifying glass supported by the holder with the lens thereof facing the needle eye, and means for varying the spacing between the lens of the magnifying glass and the needle eye for locating the needle eye at the correct focal length of the lens to best accommodate the particular user when threading the needle.

---

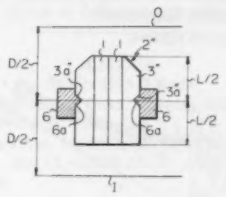
**4,147,412**

## FIXTURE FOR MOUNTING BAR LENS ARRAY IN ELECTROPHOTOGRAPHIC APPARATUS

**Atsushi Kawamura, and Motoaki Kawazu, both of Tokyo, Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan**

**Division of Ser. No. 621,881, Oct. 14, 1975, Pat. No. 4,059,345. This application Sep. 8, 1977, Ser. No. 831,625**
**Claims priority, application Japan, Oct. 17, 1974, 49-119692**
**Int. Cl.² G02B *7/02***
**U.S. Cl. 350—252** **4 Claims**

1. A fixture for mounting a bar lens in such a manner that ends of the bar lens are equally spaced from two respective planes, comprising first alignment means provided halfway between the ends of the bar lens, and second alignment means fixedly disposed halfway between the two planes, the first and second alignment means being arranged so that when the first




and second alignment means are aligned, the ends of the bar lens are equally spaced from the two respective planes.

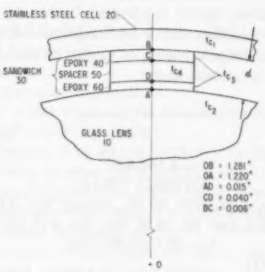
---

**4,147,413**

## TEMPERATURE COMPENSATED LENS MOUNT

**David J. Sims, and Billy D. Miracle, both of Loveland, Colo., assignors to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Mar. 7, 1977, Ser. No. 775,085**
**Int. Cl.² G02B *7/02***
**U.S. Cl. 350—253** **6 Claims**




1. Apparatus for mounting a circular optical element in axial alignment within a circular aperture of a frame, the element having a first radius and the aperture having a second radius greater than the first radius, the frame and the optical element having different temperature coefficients of expansion and the distance between the outer circumference of the optical element and the circumference of the aperture being a function of temperature and of the respective temperature coefficients of expansion, the apparatus comprising:

a plurality of mounting means each positioned between and bonded to the frame and the optical element and each having a dimension which varies as a function of temperature and the temperature coefficient of expansion of the mounting means and which substantially equals the distance between the optical element and the frame over a range of temperatures.

---

**4,147,414**

## SUNLIGHT CONCENTRATOR FOR ENERGY CONVERSION

**William H. Raser, 6451 W. 83rd St., Los Angeles, Calif. 90045**

**Continuation-in-part of Ser. No. 747,561, Dec. 16, 1976, abandoned. This application Apr. 24, 1978, Ser. No. 899,244**
**Int. Cl.² G02B *5/12;* F24J *3/02***
**U.S. Cl. 350—289** **13 Claims**

1. A heliostat orienting system, including:

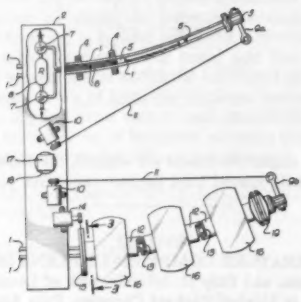
base means;

azimuth orienting means including a first horizontal arm supported by said base at a first point on said arm, for

movement of points on said arm, remote from said first point, only in a horizontal plane;

elevation orienting means including a first sleeve encircling said first horizontal arm and rotatably supported therefrom for rotation thereabout;

a source of control signals;



azimutal drive means supported by said base means, coupled to said first horizontal arm and responsive to signals from said source for positioning each point along said first horizontal arm at a desired azimuthal position; and

elevational drive means supported from said base means coupled to said first sleeve and responsive to signals from said sources for positioning any point on said first sleeve at a desired elevational angle.

---

**4,147,415**

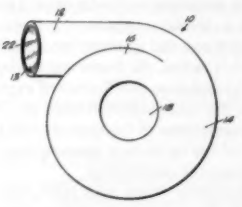
## ENERGY TRAP

**Myles G. Dolan, 3600 NW. 60 St., Miami, Fla. 33142**

**Filed Jan. 30, 1978, Ser. No. 873,108**

**Int. Cl.² G02B 7/00**

**U.S. Cl. 350—321** **4 Claims**



1. An apparatus for trapping wave energy comprising:

a shell-like tubular body having a hollow center and defining a central hole, generally in the middle of the shell-like tubular body, with a straight entrance zone, and having a single entrance, said single entrance being

a tapered entrance adjacent the straight entrance zone wherein a wall is provided in the straight entrance zone forming an interior mouth,

a circular zone adjacent the interior mouth zone whereby the straight entrance zone is tangential to the circular zone, and

a generally rounded circular interior body circumposed about the central hole whereby wave energy passing through the straight entrance zone is reflected in the interior mouth zone and directed by the reflection and the fact that the angle of incidence equals the angle of reflection to the circular zone where it is re-reflected to the interior.

**4,147,416**

## ELECTROCHROMIC DISPLAY DEVICE

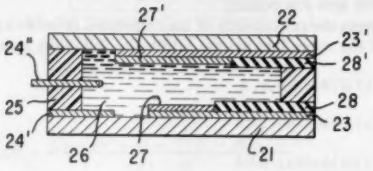
**Shotaro Shimizu, Kunitachi, Japan, assignor to Citizen Watch Co., Ltd., Tokyo, Japan**

**Filed Mar. 30, 1977, Ser. No. 782,987**

**Claims priority, application Japan, Mar. 30, 1976, 51/34954; Mar. 30, 1976, 51/34955; Apr. 2, 1976, 51/36880**

**Int. Cl.² G02F 1/00**

**U.S. Cl. 350—357** **13 Claims**




1. An electrochromic display device comprising:

a transparent front substrate;

at least one transparent first display electrode, which is part of a predetermined display pattern, formed on said front substrate;

a counter substrate parallel to said front substrate;

at least one second display electrode provided on said counter substrate adjacent said first display electrode on said front substrate, said second display electrode forming the remainder of said predetermined display pattern, said first and said second display electrodes being arranged and configured such that said predetermined display pattern is displayed by driving said first and said second display electrodes at the same time; an electrochromic material on said first and said second display electrodes; a transparent electrolyte enclosed between said front and said counter substrates; said transparent electrolyte in contact with said electrochromic material; and

a counter electrode in electrical contact with said electrolyte.

---

**4,147,417**

## OPTICAL SENSING SYSTEM FOR FOCUSING A REFLEX CAMERA

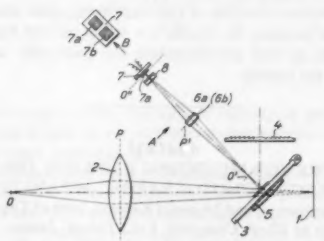
**Walter Mandler, Midland, Canada, assignor to Ernst Leitz Wetzlar GmbH, Wetzlar, Fed. Rep. of Germany**

**Filed Mar. 9, 1977, Ser. No. 775,791**

**Claims priority, application Fed. Rep. of Germany, Mar. 10, 1976, 2609877**

**Int. Cl.² G03B 7/08**

**U.S. Cl. 354—25** **16 Claims**




1. An optical sensing system suitable for indicating the sharpness of focus of the objective of a reflex camera upon an object being sighted, comprising:

(a) a reflex mirror positioned behind the objective and having in its central region an area of partial reflectivity;

(b) a fully reflective mirror element positioned to the back side of said reflex mirror in the area of partial reflectivity,

whereby an image of the exit pupil of the camera objective is projected onto an auxiliary plane located above the reflecting surface of said reflex mirror when said system is in its normal viewing position;

(c) a pair of spaced auxiliary objectives located in the auxiliary plane; and

(d) a pair of photoelectric sensors spaced from said auxiliary objectives opposite from said mirrors and the centers of said sensors being spaced apart from one another a distance equal to the spacing of said auxiliary objectives, whereby light from a different part of the exit pupil is projected by each of said auxiliary objectives onto each respective sensor.

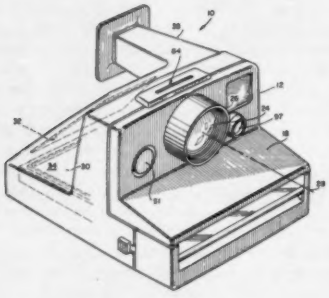
---

**4,147,418**

## PHOTOGRAPHIC EXPOSURE CONTROL SYSTEM WITH INDEPENDENT AMBIENT AND ARTIFICIAL ILLUMINATION CONTROL MODES

**George D. Whiteside, Lexington, and Irving Laskin, Sharon, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.**

**Filed Oct. 11, 1977, Ser. No. 841,192**
**Int. Cl.[2] G03B 7/16**
**U.S. Cl. 354—27** **10 Claims**



1. A photographic camera apparatus for use in either an ambient scene lighted mode or an artificially scene lighted mode wherein the camera includes means for mounting photographic film material at a given focal plane, said camera comprising:

a blade mechanism;

means for mounting said blade mechanism for displacement between a first arrangement wherein it precludes scene light from reaching the film plane and a second arrangement wherein it defines a maximum size aperture, said blade mechanism serving to define a first range of progressively increasing sized apertures for admitting scene light to the film plane as it moves from its said first arrangement to its said second arrangement;

selectively actuable means cooperatively associated with said blade mechanism and said mounting means for alternately detecting scene light during the ambient scene lighted mode in a manner maintaining a first select corresponding relationship between the detected scene light and the scene light admitted to the focal plane by said blade mechanism as it moves through said range of apertures between said first and second arrangements, and for detecting scene light during the artificially scene lighted mode in a manner maintaining a second select corresponding relationship between the detected scene light and the scene light admitted to the focal plane by said blade mechanism as it moves through said range of apertures between said first and second arrangements;

means for integrating said detected scene light to provide an output signal corresponding to a select exposure value; and

selectively actuable drive means for initially displacing said blade mechanism from its said first arrangement toward its said second arrangement, and for thereafter displacing said blade mechanism back toward its said first arrangement in response to said output signal from said scene light integrating means to define an exposure cycle.

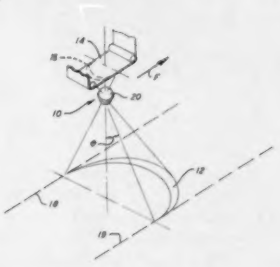
---

**4,147,419**

## SCAN CAMERAS

**Gerard E. Boyan, Redding, Conn., assignor to The Perkin-Elmer Corporation, Norwalk, Conn.**

**Filed Apr. 14, 1977, Ser. No. 787,529**
**Int. Cl.[2] G03B 39/00, 37/00**
**U.S. Cl. 354—66** **5 Claims**



1. A dual-field globe lens strip camera system which, in combination, comprises:

globe lens means;

a first image-receiving surface;

first semicircular exposure slit means disposed adjacent said first image-receiving surface;

said lens means, first image-receiving surface and first slit means being so mounted that a first semicircular strip at a first constant preselected field angle in an object field is focused on the first image-receiving surface;

a second image-receiving surface;

second semicircular exposure slit means disposed adjacent said second image-receiving surface;

fold flat means interposed between said globe lens means and said second exposure slit means;

said lens means, fold flat means, second image-receiving surface, and second exposure slit means being so mounted that a second semicircular strip at a second constant preselected field angle in the object field is focused on the second image-receiving surface;

said first field angle being substantially greater than said second field angle to provide a wide field coverage supplemented by a narrow field with a less oblique perspective;

said system being fixedly supported in a vehicle whereby the forward velocity of the vehicle provides image motion;

said first exposure slit means and said second exposure slit means being curved to correspond to field points of equal range respectively so that there is substantially no differential image motion within the slits, respectively; and

means for moving said image-receiving surfaces in the direction of vehicle movement at speeds corresponding to the altitude-velocity ratio of the vehicle with respect to the object field.

---

**4,147,420**

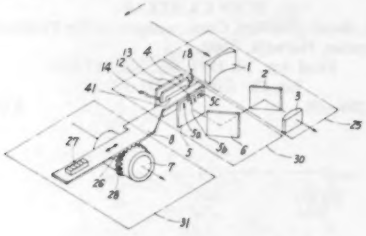
## FLASH CAMERA

**Hiroshi Iwata, and Tetsuo Yamaoka, both of Osaka, Japan, assignors to West Electric Company, Ltd., Osaka, Japan**

**Filed Jun. 8, 1977, Ser. No. 804,805**
**Claims priority, application Japan, Jun. 17, 1976, 51-71956**
**Int. Cl.[2] G03B 15/05, 13/08, 13/18, 17/00**
**U.S. Cl. 354—127** **4 Claims**

1. A flash camera comprising an electronic flash device for

flashing a flash tube by an electric charge stored in a capacitor by a high voltage from a DC-DC converter circuit, and a zone focus type focusing system including a finder, an object-distance indicating means and a focus-adjusting means, said indicating means having an indicator with symbol marks of the object distance thereon and a pointer linked to said focus-adjusting means, characterized in that:



said indicating means has an electro-luminescent device which is connected to said DC-DC converter and is situated to illuminate said symbol marks and said pointer and further comprising:

a frame having a light-reflecting face for reflecting the images of said symbol marks and said pointer to an eye piece of said finder.

---

**4,147,421**

## COLLAPSIBLE CAMERA

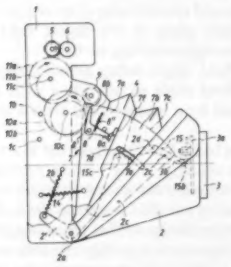
**Günter Fauth, Unterhaching, and Peter Lermann, Narring, both of Fed. Rep. of Germany, assignors to AGFA-Gevaert AG, Leverkusen, Fed. Rep. of Germany**

**Filed Jul. 26, 1977, Ser. No. 819,417**

**Claims priority, application Fed. Rep. of Germany, Jul. 30, 1976, 2634383**

**Int. Cl.² G03B *17/04, 17/42, 17/52***

**U.S. Cl. 354—192** **11 Claims**



1. In a camera, particularly an instant-picture camera, a combination comprising a camera body; a lens mount connected to said body and movable relative thereto between an extended and a retracted position; a film transporting mechanism having an input member; and means for driving said film transporting mechanism, comprising an arcuate drive segment having a serrated periphery engageable with said input member and being composed of at least two segment parts which are each provided with a portion of said serrated periphery and are displaceable relative to one another and to said input member in response to movement of said lens mount between said positions thereof.

**4,147,422**

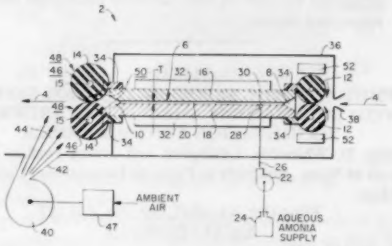
## METHOD AND APPARATUS FOR EVACUATING AQUEOUS AMMONIA VAPOR FROM FILM DEVELOPING CHAMBERS

**Rolf D. Kahle, Saratoga, and John W. Meadows, Los Altos, both of Calif., assignors to Quantor Corporation, Mountain View, Calif.**

**Filed Apr. 17, 1978, Ser. No. 897,079**

**Int. Cl.² G03D *7/00***

**U.S. Cl. 354—299** **30 Claims**




1. In a method for developing a film in an aqueous ammonia atmosphere including the steps of providing a substantially sealed developing chamber; advancing film to be developed in a downstream direction through an intake opening of the chamber into the chamber; withdrawing the film in a downstream direction from the chamber through an outlet opening of the chamber; at least intermittently introducing into the chamber aqueous ammonia; at least intermittently removing from the chamber spent aqueous ammonia; and maintaining the interior of the chamber at a sufficiently elevated temperature to maintain the aqueous ammonia in its vapor state, the improvement to the step of removing comprising the steps of: providing a body defining at least one surface; maintaining the temperature of the surface sufficiently below the temperature of the chamber interior to cause the formation of minute aqueous ammonia condensate droplets thereon; substantially continuously moving the surface into and out of the chamber so as to collect aqueous ammonia condensate on the surface when the surface is disposed within the chamber; and removing such condensate from the surface while the surface is on the exterior of the chamber and before it is re-introduced into the chamber.

---

**4,147,423**

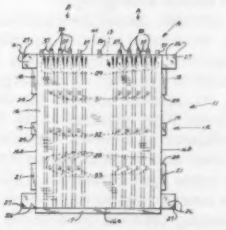
## RACK FOR PHOTOGRAPHIC FILM

**S. Rex Sayre, 930 Mississippi Ave., Davenport, Iowa 52803**

**Filed Sep. 19, 1977, Ser. No. 834,738**

**Int. Cl.² G03D *13/12***

**U.S. Cl. 354—344** **4 Claims**



1. A rack for photographic sheet film, said rack comprising:

frame means having end plates and side members, said end plates being connected by said side members, each end plates defining an open top side, said side members being spaced apart to provide substantially open sides;

means for holding sheet film including a plurality of grooves formed into said end plates, each groove in one of said end plates facing toward, and being in alignment with, one of said grooves in the other of said end plates to form an aligned groove pair; and

guide means spanning said open top side, said guide means including a plurality of guide bars attached to and extending between said end plates, each guide bar being placed adjacent to one of said aligned groove pairs, said guide means including a plurality of projections, said projections being attached to said guide bars, each guide bar having a different number of projections attached thereto.

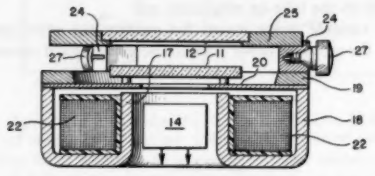
---

**4,147,424**

## RADIATION DISCRIMINATION SYSTEM

**L. Curtis Foster, Atherton, and John P. Lindley, Redwood City, both of Calif., assignors to Itek Corporation, Lexington, Mass.**

**Filed Jan. 16, 1967, Ser. No. 609,994**
**Int. Cl.[2] G01B 9/02**
**U.S. Cl. 356—352** **7 Claims**




1. A system, which of itself, includes no source of coherent radiation, but which may produce an indication in the presence of such a source comprising:

a pair of parallel partially-reflective mirrors together defining an optical interference filter for responding to incident radiation originating from a source external to said system;

means for sinusoidally varying the spacing between said mirrors and correspondingly changing the transmission wavelengths of said mirrors and for developing a reference signal representative of the variation in said spacing;

means disposed on one side of said filter for detecting radiation transmittted therethrough to yield a detection signal; and

means responsive to the simultaneous applications of said reference and detection signals for developing an indication signal.

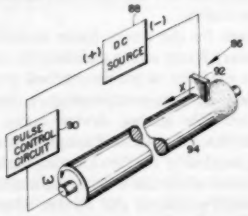
---

**4,147,425**

## PHOTOGRAPHIC PROCESSING ROLLER HAVING A SURFACE ROUGHENED BY ELECTRIC DISCHARGE MACHINING

**Harvey S. Friedman, Natick; Irving S. Lippert, Lexington, both of Mass., and John W. Lothrop, Windham, N.H., assignors to Polaroid Corporation, Cambridge, Mass.**

**Filed May 1, 1978, Ser. No. 901,910**
**Int. Cl.[2] G03D 9/02**
**U.S. Cl. 354—304** **9 Claims**




1. In an improved cylindrical processing roller for use in a motor driven photographic processing apparatus of the type for advancing an integral type self-processable film unit to the exterior of a camera while simultaneously spreading a fluid processing composition between selected layers of the film unit and of the type having a circumferential surface of given length machined to a precision diameter to facilitate spreading the fluid processing composition in a substantially uniform thin layer between the film unit's selected layers, the improvement comprising a plurality of generally spaced apart, substantially uniform sized and shaped microscopic craters formed along a predetermined length of said surface by transferring to said predetermined length of said surface a plurality of high energy pulses each of which contains sufficient energy to locally melt said surface thereby creating individual ones of said craters, said craters covering no more than 50 percent of the area of said predetermined surface length and each being surrounded by a substantially uniform annular lip which extends above said surface by an amount insufficient to mark the film unit's surface and has a volume which generally equals the volume of the depressed portion of the crater which is below said surface, said roller surface being thus configured to provide said roller with a high-friction characteristic for transporting a film unit while being insufficiently rough to leave any visually perceptible marks on a film unit's surface, to minimize pickup of particulate matter from the film unit which would otherwise build up and reduce said high-friction characteristic, and to maintain the effectiveness of said roller's precision diameter so that substantially no change in its fluid spreading performance results from the presence of said craters.

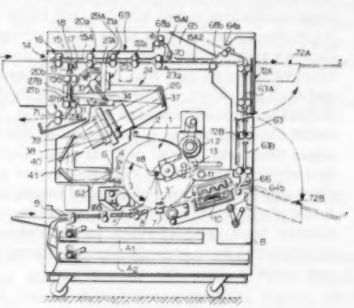
---

**4,147,426**

## ELECTROSTATIC PHOTOGRAPHIC COPYING MACHINE

**Hideo Miyoshi, Habikino; Kiyoshi Shibata, Osaka; Shogo Fukuoka, Kobe, and Tatsuo Aizawa, Osaka, all of Japan, assignors to Mita Industrial Company, Ltd., Osaka, Japan**

**Filed Jun. 1, 1977, Ser. No. 802,530**
**Claims priority, application Japan, Jun. 2, 1976, 51-65078; Jun. 2, 1976, 51-65079; Jun. 5, 1976, 51-72675[U]; Jul. 17, 1976, 51-96018[U]; Aug. 7, 1976, 51-94269; Aug. 23, 1976, 51-100800**
**Int. Cl.[2] G03G 15/22**
**U.S. Cl. 355—3 SH** **26 Claims**



1. An electrostatic photographic copying apparatus comprising:

a rotatable photosensitive body having on the surface thereof a layer of photosensitive material;

changing means positioned adjacent said body for charging said layer;

optical system means for projecting an image from original paper onto said layer after said layer is charged by said charging means;

means for conveying original paper past said optical system means, said conveying means including an original paper carrying passage, an original paper inlet for introducing original paper into said original paper carrying passage,

first original paper outlet means for discharging original paper in a first direction from said original paper carrying passage, and second original paper outlet means for discharging original paper in a second direction from said original paper carrying passage;

developing means positioned adjacent said body for developing said image on said layer;

supply means for supplying copying paper to a position adjacent said body after said image has been developed by said developing means;

transfer means positioned adjacent said body for transferring said image from said layer to said copying paper;

fixing means for fixing said image on said copying paper;

first and second oscillating bodies having passages extending therethrough, said first and second bodies being oscillatable between respective first positions thereof, whereat said passages thereof are aligned, and respective second positions thereof, whereat said passages thereof are not aligned;

said passages of said first and second bodies, when said first and second bodies are in said respective first positions thereof, forming a copying paper carrying passage having a first end extending from said fixing means and a second end;

first copying paper outlet means for discharging copying paper from said second end of said copying paper carrying passage in a first direction, when said first and second bodies are in said respective first positions thereof;

second copying paper outlet means for discharging copying paper from said fixing means in a second direction when said first and second bodies are in said respective second positions thereof;

original paper outlet changing means for selectively controlling which of said first or second original paper outlet means is operable to discharge original paper from said original paper carrying passage;

copying paper outlet changing means for selectively opening or closing said second copying paper outlet means; and

said first and second oscillating bodies, said original paper outlet changing means, and said copying paper outlet changing means being interconnected such that when said first and second bodies are in said respective first positions thereof said original paper outlet changing means is positioned to discharge original paper from said first original paper outlet means and said copying paper outlet changing means is positioned to allow said copying paper to pass through said copying paper carrying passage and be discharged through said first copying paper outlet means, and such that when said first and second bodies are in said respective second positions thereof said original paper outlet changing means is positioned to discharge original paper from said second original paper outlet means and said copying paper outlet changing means is positioned to discharge copying paper from said second copying paper outlet changing means, whereby the paths of travel of the original paper and copying paper within the copying machine may be selectively altered without intersection of said paths.

---

**4,147,427**

## VARIABLE WORKING DISTANCE PHOTOGRAPHIC PRINTER WITH STATIONARY PAPER MAGAZINES

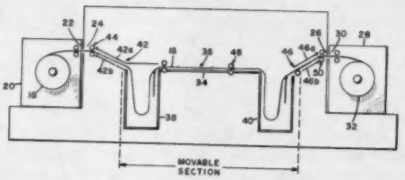
**James F. Stewart, Shoreview, Minn., assignor to Pako Corporation, Minneapolis, Minn.**

**Filed Feb. 24, 1978, Ser. No. 880,897**
**Int. Cl.[2] G03B *27/58***
**U.S. Cl. 355—72** **9 Claims**

1. In a photographic printer of the type which receives unexposed print paper from an external supply magazine and provides exposed print paper to an external take-up magazine, the improvement comprising:

a movable paper deck for supporting the print paper at a print gate within the printer where the print paper is exposed, the movement of the movable deck being independent of the supply and take-up magazines and being in a perpendicular direction to the plane of the print paper, and the position of the movable deck affecting the magnification of prints made on the print paper;

a first fixed opening for receiving print paper from the supply magazine into the printer;




first variable guide means for guiding the print paper from the first fixed opening to the movable paper deck;

a second fixed opening for passing print paper from the printer to the take-up magazine; and

second variable guide means for guiding the print paper from the movable paper deck to the second fixed opening.

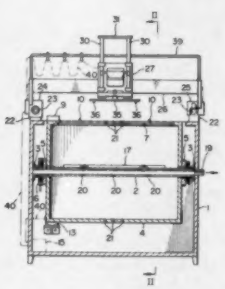
---

**4,147,428**

## DEVICE FOR POSITIONING FILMS ON BASE SHEETS

**Yukio Nishikawa; Yoshio Ono, and Fumihiko Nishida, all of Kyoto, Japan, assignors to Dainippon Screen Seizo Kabushiki Kaisha, Japan**

**Filed Jan. 25, 1978, Ser. No. 872,089**
**Claims priority, application Japan, Jan. 25, 1977, 52-7531**
**Int. Cl.[2] G03B *27/04***
**U.S. Cl. 355—88** **7 Claims**



1. A device for positioning films on base sheets, comprising:

a fixed frame;

a rotary frame mounted in the fixed frame so as to be rotatable about an axis, and having a plurality of faces adapted to support base sheets;

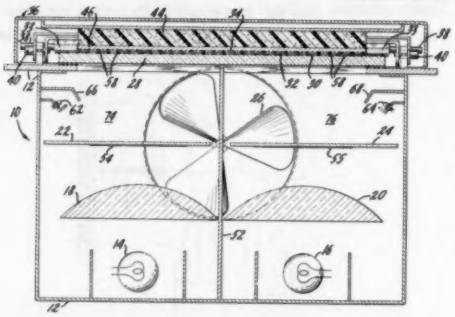
a positioning means for the rotary frame adapted to rotate and stop the rotary frame and to maintain the rotary frame in any one of a plurality of pre-determined positions; and

a movable setting device incorporating a film locating means, said movable setting device being adjustably mounted to the fixed frame, and adapted to hold a film which is being located by the film locating means on a face of the rotary frame when this is being maintained in one of its pre-determined positions, and further adapted to preserve its position and orientation relative to the fixed frame while the rotary frame is rotated to a different pre-determined position.

## 4,147,429
## APPARATUS AND PROCESS FOR PHOTOGRAPHICALLY DUPLICATING INTELLIGENCE EXISTING ON PHOTOPLASTIC FILM

Gordon Lysle, Greenlawn, N.Y., assignor to Microx Corporation, Hauppauge, N.Y.

Filed Jan. 31, 1978, Ser. No. 873,926
Int. Cl.[2] G03B 27/04, 27/16, 27/78
U.S. Cl. 355—133 41 Claims



11. Apparatus for producing, on light sensitive films, duplicates of master films having deformable layers of between 8 and 25μ thick whereon intelligence has been recorded in the form of deformation images, comprising

(a) master film support means;

(b) duplicate film support means;

(c) means for spacing said duplicate from said master at a predetermined gap distance in mils of from $1[n_x/n_a]$ to $3.5[n_x/n_a]$ where $n_a$ is the index of refraction of air and $n_x$ is the index of refraction of the medium in said gap;

(d) means for positioning said duplicate film parallel to and in predetermined transverse relation to said master;

(e) at least two sources of light;

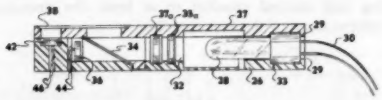
(f) means for directing the radiation from said sources through said master, across said gap and thence to said duplicate film; and

(g) means for predetermining and controlling the time period during which said duplicate is exposed to said light.

## 4,147,430
## SECONDARY DETECTION SYSTEM FOR SECURITY VALIDATION

Robert L. Gorgone, Mentor; Gerald Iannadrea, Painesville, and Alan J. Kovach, Cleveland, all of Ohio, assignors to Ardac, Inc., Willoughby, Ohio

Filed Nov. 10, 1976, Ser. No. 740,614
Int. Cl.[2] G01N 21/34; G06K 9/08, 7/10
U.S. Cl. 356—51 12 Claims



1. A secondary detection system for security validation, comprising:

a lamp maintained within a housing, said housing defining a light pipe;

light reflection means maintained at an end of said light pipe in juxtaposition to the security and in light receiving communication with said lamp for reflecting said light upon the security, said light reflection means being partially light transmissive;

reference means maintained within said housing adjacent said light reflection means for determining the amount of light reflected thereby and producing a first output signal indicative thereof;

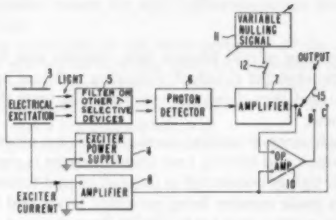
light sensing means maintained within said housing and in juxtaposition to the security for receiving light from the security and producing a second output signal indicative thereof; and

comparator means interconnected between said reference and light sensing means for receiving said first and second output signals and determining validity of the security on the basis of the relative values of said output signals.

## 4,147,431
## APPARATUS AND METHOD FOR MEASURING PRESSURES AND INDICATING LEAKS WITH OPTICAL ANALYSIS

Joseph K. Mann, Palo Alto, Calif., assignor to Varian Associates, Inc., Palo Alto, Calif.

Continuation of Ser. No. 680,609, Apr. 26, 1976, abandoned.
This application Jan. 25, 1978, Ser. No. 872,209
Int. Cl.[2] G01M 3/40
U.S. Cl. 356—72 30 Claims




15. A method for analyzing gas in a vacuum enclosure, comprising the steps of:

exciting gas atoms to cause a gaseous discharge phenomena;

deriving a first signal from the de-excitation of gas atoms from said gaseous discharge representative of the partial pressure of a selected gas in said enclosure;

deriving a second signal proportional to said step of exciting gas atoms said second signal representative of the total pressure in said enclosure, whereby said second signal is causatively related to said gaseous discharge and said first and second signals are causally correlated; and

comparing said first and second signals to obtain the relative magnitude thereof.

## 4,147,432
## APPARATUS FOR THERMAL DIFFUSION BY HIGH FREQUENCY INDUCTION HEATING OF SEMICONDUCTOR SUBSTRATES

Masao Yamawaki, Handa; Katsuo Aoki, Aichi; Yoshio Oka, Toyota; Takao Suzuki, Kariya; Masahiko Amano, Handa; Hideki Ozaki, Gamagori, and Osamu Ishihara, Toyota, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Nov. 22, 1976, Ser. No. 744,049
Claims priority, application Japan, Nov. 26, 1975, 50-141788
Int. Cl.[2] C23C 13/08
U.S. Cl. 118—49.1 11 Claims

1. An apparatus for thermal diffusion treatment of semiconductor substrates by means of high frequency induction heating comprising;

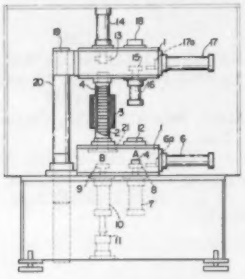
(a) a diffusion furnace tube having open ends and a predetermined atmosphere,

(b) means for sealing the furnace tube from open air provided at both ends of said furnace tube,

(c) high frequency induction heating means, including an induction heating coil provided around the outer periphery of said furnace tube,

(d) a plurality of heating bases made of a material having a good electric conductivity which is hardly liable to discharge ions at high temperature and designed to load semiconductor substrates to be treated for thermal diffusion in said furnace tube,

(e) transfer means for the successive transportation of said plurality of heating bases from the inlet opening toward the outlet opening of said furnace tube, including a means for pushing said plurality of heating bases successively one after the other from the inlet opening toward the outlet



opening of said furnace tube, thereby said heating bases are subjected to induction heating with said heating means so that they receive substantially the same thermal treatment,

(f) said open air sealing means including a clean chamber in which said heating base transfer means is provided being air tightly connected to one end of said furnace tube, and

(g) a guide member being provided inside said furnace tube for guiding said heating bases from the inlet to the outlet of said furnace tube.

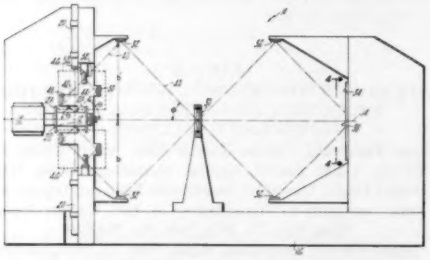
---

**4,147,433**

## CONTOUR INSPECTION

**William H. Drinkuth, Hebron, Conn., assignor to United Technologies Corporation, Hartford, Conn.**

**Continuation of Ser. No. 751,558, Dec. 17, 1976, abandoned.**
**This application Dec. 12, 1977, Ser. No. 860,420**
**Int. Cl.[2] G01B *11/24;* G02B *27/14***
**U.S. Cl. 356—390** **9 Claims**



1. Contour inspection apparatus of the type having an imaging element for projecting the image of a light pattern on the article to be inspected wherein the improvement comprises:

a first forming mirror and a second forming mirror which bracket the light pattern on the article to be inspected; and

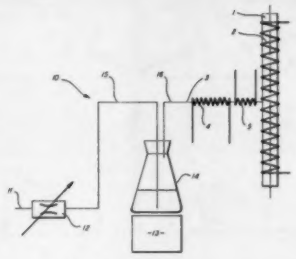
a beam splitter which is optically aligned with said first and second mirrors to form a composite optical path comprising a first segment reflected from said first forming mirror and a second segment reflected from said second forming mirror.

**4,147,434**

## METHOD AND APPARATUS FOR DETERMINING VOLATILE AND DECOMPOSABLE COMPOUNDS BY ATOMIC ABSORPTION

**Bernhard Huber, Uberlingen, Fed. Rep. of Germany, assignor to Bodenseewerk Perkin-Elmer & Co., GmbH, Uberlingen, Fed. Rep. of Germany**

**Filed Sep. 6, 1977, Ser. No. 830,817**
**Claims priority, application Fed. Rep. of Germany, Sep. 8, 1976, 2640285**
**Int. Cl.[2] G01J *3/30***
**U.S. Cl. 356—312** **15 Claims**



1. In an improved method for sample preparation in atomic absorption spectroscopic determination of elements which can form volatile, thermally decomposable compounds, the method including the steps of preparing a gaseous test sample from the sample material, transferring the gaseous test sample in an inert gas through a conduit to a heatable measuring cell and heating the measuring cell to the atomization temperature wherein the improvement comprises the step of heating the conduit to the thermal decomposition temperature to thermally decompose the gaseous test sample in the conduit prior to its entry into the measuring cell.

6. An apparatus for preparing a sample wherein the sample contains elements which can form thermally decomposable compounds and wherein the sample is suitable for atomic absorption determination of the elements of the sample in the apparatus comprising, in combination:

a closable reaction vessel in which a gaseous test sample is formed;

a source of inert gas coupled by a first conduit of said vessel to permit introduction of inert gas into said vessel;

a measuring cell disposed to permit the rays of an atomic absorption spectrometer to pass therethrough;

a first heating winding for heating said measuring cell to an independently selectable first temperature;

a second conduit disposed between said measuring cell and said vessel; and

a second heater winding for heating said second conduit in the region near the junction of said second conduit and said measuring cell, said second heater winding for heating said second conduit to at least the decomposition temperature of the test sample.

---

**4,147,435**

## INTERFEROMETRIC PROCESS AND APPARATUS FOR THE MEASUREMENT OF THE ETCH RATE OF OPAQUE SURFACES

**Millard A. Habegger, Boulder, Colo., assignor to International Business Machines Corporation, Armonk, N.Y.**

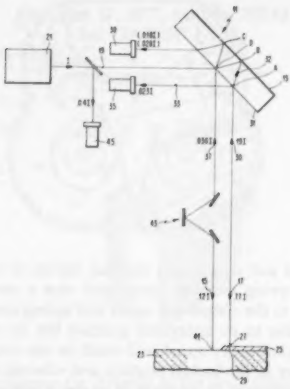
**Filed Jun. 30, 1977, Ser. No. 811,741**
**Int. Cl.[2] G01B *9/02***
**U.S. Cl. 356—357** **5 Claims**

1. An interferometer system for determining the etch rates of an opaque material and an overlying transparent layer which partially masks the opaque material comprising:

a light source having a wavelength λ,

means for dividing the light into two parallel beams one of which is directed onto the free surface of the opaque material and the other of which is directed onto the transparent layer in a direction perpendicular to the surfaces of the layers,

a first detector means located in the path of the interfering reflected beams returning from the surface of the transparent layer and from the underlying surface of the opaque material to measure and record the change in light intensity of the interfering reflected beams as a function of time with one period of oscillation of the light intensity corresponding to a thickness change in the transparent layer of $\lambda/2n$ where n is the refractive index of the transparent layer,



a second detector means located in the path of the interfering reflected beams returning from the free surface of the opaque material and from the underlying surface of the opaque material to measure and record the change in light intensity of the interfering reflected beams as a function of time with one period of oscillation of the light intensity corresponding to the removal of an opaque layer thickness of $\lambda/2\text{-}\Delta X(n\text{-}1)$, where $\Delta X$ is the thickness change of the transparent layer during the same period of time.

---

**4,147,436**

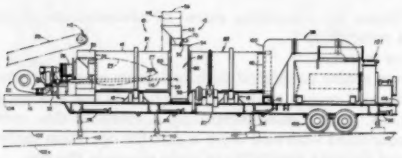
## METHOD AND APPARATUS FOR PRODUCING HOT MIX ASPHALT UTILIZING RECYCLABLE ASPHALT AGGREGATE

**David L. Garbelman, Edmond; William H. Minor, Bethany, and Arthur G. Shaw, Mustang, all of Okla., assignors to CMI Corporation, Oklahoma City, Okla.**

**Continuation-in-part of Ser. No. 828,498, Aug. 29, 1977, abandoned. This application Feb. 23, 1978, Ser. No. 880,712**

**Int. Cl.[2] B28C *1/22***

**U.S. Cl. 366—25** **23 Claims**



1. Apparatus for producing hot mix asphalt utilizing new aggregate and a previously manufactured and laid asphalt mix which has been reduced to form recyclable aggregate, comprising:

a cylindrical mixer drum having an input end, an output end, and a recyclable aggregate feeding port extending radially through a medial portion thereof;

means supporting the mixer drum for rotation about the longitudinal axis thereof with the input end of the mixer drum higher than the output end of the mixer drum;

means at the input end of the mixer drum for producing a flame in the mixer drum extending from the input end of the mixer drum to a medial portion of the mixer drum;

a recyclable aggregate feeding port cover pivotally connected to the mixer drum adjacent the recyclable aggregate feeding port therethrough, the recyclable aggregate feeding port cover rotating under the influence of gravity between an open position uncovering the recyclable aggregate feeding port and a closed position covering the recyclable aggregate feeding port in response to the rotation of the mixer drum;

a shroud assembly disposed around the medial portion of the mixer drum and enclosing the recyclable aggregate feeding port, the shroud assembly having an input hopper portion communicating with the recyclable aggregate feeding port when the recyclable aggregate feeding port cover is in the open position thereof;

recyclable aggregate conveyor means for feeding the recyclable aggregate into the input hopper portion of the shroud assembly;

new aggregate conveyor means for feeding the new aggregate into the input end of the mixer drum;

asphalt injection means for injecting asphaltic oil into the mixer drum;

flight means connected to the inner periphery of the mixer drum for moving the new aggregate and recyclable aggregate around the mixer drum and mixing the asphaltic oil, new aggregate and recyclable aggregate within the mixer drum to form a hot mix asphalt; and

means for discharging the hot mix asphalt from the output end of the mixer drum.

---

**4,147,437**

## MIXER BLADE

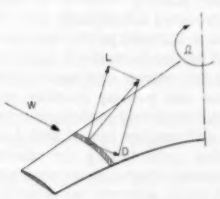
**Pierre Jonqueres, Epinay sur Orge, France, assignor to Procedes SEM, Cachan, France**

**Filed May 28, 1976, Ser. No. 690,933**

**Claims priority, application France, Jun. 4, 1975, 75 17429**

**Int. Cl.[2] B01F *7/22***

**U.S. Cl. 366—343** **6 Claims**




1. An axial flow bladed impeller intended for exerting a stirring action in a fluid medium, the primary phase of which is liquid, contained in a vessel designed such that the configuration of the blowing zone can be forecast and calculated in order to optimize the efficiency of the mixing effect, by the action of generally centripetal secondary radial currents, said impeller having a rotational axis and plural blades spaced therearound, each said blade being formed of a trapezoidal sheet of material such that said blade has a constant thickness, each said blade having a leading edge and a trailing edge, taken in the direction of rotation of said impeller, all sections of each said blade formed at positions radially spaced from said rotational axis being curved, the distance between said leading edge and said trailing edge of each said blade continuously decreasing from said rotational axis to the outer blade tip, and for any given said section of each said blade there being an angle of incidence defined between a velocity vector of the

fluid flow acting on said section and a straight line extending from said trailing edge of said section to a point on said section whereat a tangent to said section is parallel to said velocity vector, said angle of incidence for each said blade continuously varying and generally decreasing from said rotational axis to said outer blade tip.

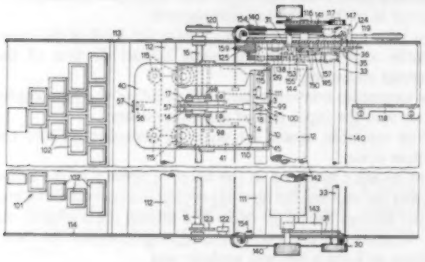
---

**4,147,438**

## SERIAL PRINTER FOR TYPEWRITERS, TELEPRINTERS AND DATA PROCESSORS

**Bruno Sandrone, Ivrea; Giuseppe Nuccio, Candia Canavese, and Emilio Gilardi, Caluso, all of Italy, assignors to Ing C. Olivetti & C., S.p.A., Ivrea, Italy**

**Filed Apr. 4, 1977, Ser. No. 784,425**
**Claims priority, application Italy, Apr. 21, 1976, 67948 A/76**
**Int. Cl.[2] B41J *1/30***
**U.S. Cl. 400—144.2** **12 Claims**



1. A serial printer for typewriters, teleprinters, and data processing output devices, comprising a printing head including a plurality of individual character carriers, each character carrier including a flexible leaf spring carrying a character substantially at the free end thereof, character selecting means for selectively moving said printing head to bring a selected one of said character carriers into alignment with a printing point, a paper supporting platen, a pushing member slidably movable to cause the selected character to engage the paper on said platen, a rotatable eccentric and moving means operable in a predetermined time relationship with said selecting means for rotating said eccentric, means for permanently connecting said eccentric to said pushing member to cause the latter to be positively reciprocated substantially according to an harmonic oscillatory motion having a pair of opposite dead points where the direction of motion is reversed, said pushing member, said selected character carrier and said platen being relatively disposed so that said pushing member engages said selected character carrier while said pushing member is decelerated by said eccentric and reaches one of said dead points of its said harmonic motion upon flexing the selected leaf spring and causing the selected character to penetrate a predetermined extent into said paper, whereby the printing is effected substantially through a pressure blow of the character.

---

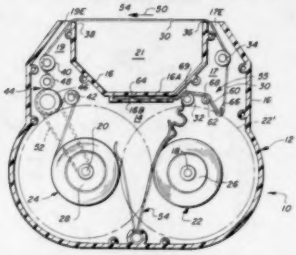
**4,147,439**

## RIBBON CARTRIDGE WITH IMPROVED RIBBON TENSIONING AND LOCKING

**Paul Colecchi, Des Plaines, Ill., assignor to A. B. Dick Company, Chicago, Ill.**

**Filed Sep. 6, 1977, Ser. No. 830,635**
**Int. Cl.[2] B41J *33/14***
**U.S. Cl. 400—208** **2 Claims**

1. In a ribbon cartridge for use in a typewriter, printer, and the like, comprising a housing having an exit and an entrance mounted therein, a ribbon supply spool and a takeup spool, a length of ribbon mounted on said supply spool and extending therefrom along a predetermined path out of the exit of said housing and back into the entrance of said housing to said takeup spool and a ribbon driving assembly, said driving assembly being drivable incrementally to transfer said ribbon from said supply spool to said takeup spool, the improvement comprising: a spring member having a fixed end and a free end which member positioned adjacent to the predetermined path of the ribbon between the supply spool and the exit from the housing and which spring member is movable from a rest position wherein said spring member bears against the ribbon along a length thereof to captivate the ribbon and prevent the ribbon from moving toward the exit, to a range of energized positions wherein the ribbon passes around said spring member's free end and said spring member serves to tension the ribbon, said spring member being such that a normal drive force applied to the ribbon will move said spring member from its rest position to its energized position but an overrun of ribbon from the supply spool will result in the return of said spring member to the locked position and wherein said spring member is preformed to conform in its rest position to a fixed roller and a fixed post such that the ribbon is sandwiched between said member and said post.



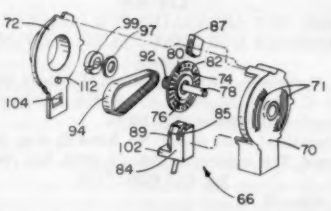
---

**4,147,440**

## SLIDING CODE DISC READER AND DETENT THEREFOR FOR DUAL PITCH WEB FEEDING

**Joseph E. Mishark, Rochester; Robert N. Peters, and Kenneth S. Pyszel, both of Sterling Heights, all of Mich., assignors to Computer Peripherals, Inc., Rochester, Mich.**

**Filed Feb. 24, 1977, Ser. No. 771,582**
**Int. Cl.[2] B41J *15/00***
**U.S. Cl. 400—611** **3 Claims**



1. Means for controlling extent of advancement of record media comprising

drive means,

driven means connected with said drive means for advancing said record media incrementally in line spacing positions, code means comprising a rotatable disc member connected with said drive means for operation therewith and defining a plurality of code channels thereon,

means sensing the rotation of said disc member,

means including a slidable member slotted for receiving said disc member and movable across the face of said disc member for reading one or another of said plurality of code channels at any one time,

switch means operable by movement of said slidable member for selection of a line spacing position, and

means including camming means on said slidable member

and a spring loaded plunger operable across a curved surface of said camming means for retaining said slidable member in one line spacing position or in another line spacing position while reading one or another of said code channels.

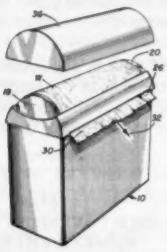
---

**4,147,441**

## UNDERARM DEODORANT APPLICATOR

**Thomas S. Harrison, New Canaan, Conn., and Ross L. Doyle, Ramsey, N.J., assignors to Sterling Drug, Inc., New York, N.Y.**

**Filed Jan. 17, 1977, Ser. No. 759,827**
**Int. Cl.[2] B05C *17/00***
**U.S. Cl. 401—208** **15 Claims**



1. An applicator for material to the body comprising a hand held container, a web of impregnated material therein, said web having a leading end adapted to be grasped and pulled out from the container, an exit opening in the container for the web,

means forming a working surface on the container, means to guide the web over the working surface as it is pulled out, the user utilizing the container as a handle in applying the web on the working surface to the body, and

means to sever the used part of the web, the severing means holding the portion of the web to the working surface during utilization of the applicator.

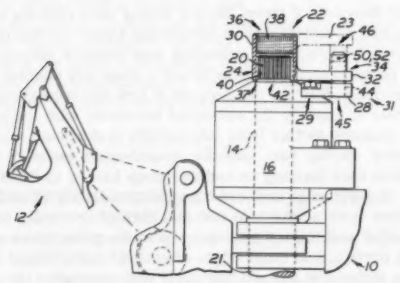
---

**4,147,442**

## SHAFT LOCKING APPARATUS

**John W. Bridwell, and Jimmy D. Myers, both of Morton, Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.**

**Filed May 1, 1978, Ser. No. 901,407**
**Int. Cl.[2] F16D *1/00*; F16L *25/00***
**U.S. Cl. 403—4** **6 Claims**



1. Locking apparatus for controllably preventing rotation of a shaft and freeing the shaft for rotation, said shaft having an end portion and an adjacent supporting structure, comprising:

means for enclosing and freeing the shaft end portion for rotation at a first position of the means relative to the shaft and for enclosing, engaging, and preventing rotation of said shaft end portion at a second position of said means relative to the shaft, said means having one end oriented toward the shaft at the first position and having another end oriented toward the shaft at the second position.

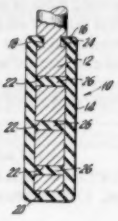
---

**4,147,443**

## HANDLE FOR A MEDICAL INSTRUMENT

**Barry A. Skobel, Edison, N.J., assignor to S & S Medical Products Co., Inc., Iselin, N.J.**

**Filed Jul. 3, 1975, Ser. No. 593,057**
**Int. Cl.[2] B25G *3/34***
**U.S. Cl. 403—267** **10 Claims**



1. A handle for a medical instrument comprising a handle portion of the medical instrument, said handle portion being fabricated from metal, said handle portion including at least one annular channel spaced from an end of the medical instrument, said channel being disposed completely around said handle portion, elastomer sealing means having a coefficient of expansion greater than coefficient of expansion of said metal handle portion, said elastomer sealing means being disposed against sidewalls of said channel and filling said channel, a major portion of said elastomer sealing means extending from said channel and being disposed against said metal handle portion for covering said metal handle portion, said elastomer sealing means providing pressure within said channel and preventing moisture from passing through said channel and from penetrating between said metal handle portion and said elastomer sealing means when the medical instrument is heated during steam sterilization thereof.

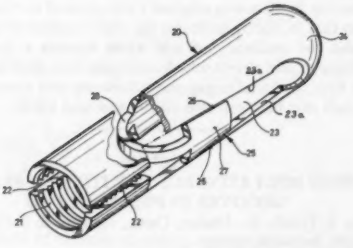
---

**4,147,444**

## EXPANSION DOWEL

**Armin Herb, Peissenberg, and Erwin Schiefer, Munich, both of Fed. Rep. of Germany, assignors to Hilti Aktiengesellschaft, Schaan, Liechtenstein**

**Filed Dec. 13, 1977, Ser. No. 860,181**
**Claims priority, application Fed. Rep. of Germany, Dec. 17, 1976, 2657353**
**Int. Cl.[2] F16B *2/04, 13/12***
**U.S. Cl. 403—313** **9 Claims**



1. An expansion dowel comprising an axially extending cylindrically shaped expansion sleeve having at least one axially extending slot therein, said sleeve having a leading end and a trailing end and a radially outer surface and a radially inner

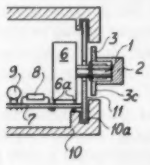
surface with the interior of said sleeve inwardly of said inner surface forming an open space, and a spreader extending in the axial direction of said sleeve and positioned in said slot for expanding said sleeve, said spreader having a first end closer to the leading end of said sleeve and a second end spaced in the direction of the trailing end of said sleeve from the first end, wherein the improvement comprises that said axially extending slot has a pair of axially extending spaced first sides with said sides being in converging relation toward the leading end of said sleeve for a least a portion of the length of said slot, said spreader having a pair of axially extending second sides disposed in converging relation toward the first end of said spreader for at least a portion of the axial length of said spreader and said second sides of said spreader being in surface contact with said first sides of said slot, and an impact piece is secured to said spreader adjacent the second end thereof and spaced from the first end thereof and said impact piece extends transversely of the axial direction of said sleeve inwardly from said spreader into the open space within said sleeve.

---

## 4,147,445
## COUPLING ARRANGEMENT

**Per-Göran Claesson, Osterhagens Gard, 142 00 Trangsund, Sweden**

**Filed Feb. 21, 1978, Ser. No. 879,598**
**Claims priority, application Sweden, Feb. 24, 1977, 7702033**
**Int. Cl.[2] F16C 3/10**
**U.S. Cl. 403—372** **8 Claims**




1. An arrangement for coupling a shaft and a knob and for causing the shaft to rotate when the knob is turned about its axis, said coupling arrangement comprising:

a shaft having a cylindrically shaped outer surface and an end face, said outer surface having a constant diameter within the region of the coupling arrangement;

a sleeve having:

a recess with an inner surface adapted to encircle said shaft, said inner surface having a diameter which is equal to said constant diameter of said shaft; and

a stop surface for limiting movement of a knob over the outer surface of said sleeve; and

a knob made of a resilient material, said knob having a recess with an inner surface adapted to encircle said sleeve, the cross-sectional area of said knob recess being smaller than the cross-sectional area of the outer surface of said sleeve;

whereby said knob is adapted to be pressed over said sleeve so that its recess encircles the outer surface of said sleeve and the resiliency of said knob imparts a compressing force to said sleeve which acts upon said shaft and imparts a firm frictional engagement between said sleeve and said shaft and between said sleeve and said knob.

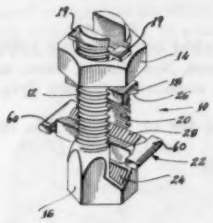
---

## 4,147,446
## SPLIT BOLT CONNECTOR WITH INTERLACED GROOVES IN PRESSURE PAD

**Walter J. Frank, Jr., Darien, Conn., assignor to Burndy Corporation, Norwalk, Conn.**

**Filed May 22, 1978, Ser. No. 907,649**
**Int. Cl.[2] B25G 3/36; E04G 7/00; F16B 7/04**
**U.S. Cl. 403—390** **10 Claims**

1. In apparatus for effecting clamping retention of elongated objects, at least one object contacting surface characterized by the fact that said surface is in the form of an elongated concavity having more than one set of lands with grooves therebetween, said lands and said grooves being oriented substantially transverse to the longitudinal axis of said concavity, along



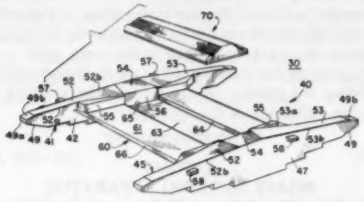

which elongated objects are oriented when clampingly retained therein, the ends of the lands of one of said sets being aligned with the ends of the grooves in the other of said sets and in proximity to the ends of the lands in said other of said sets.

---

## 4,147,447
## SNOWPLOWABLE PAVEMENT MARKER AND BASE MEMBER THEREFOR

**Sidney A. Heenan, Park Ridge, and Robert M. Flanagan, Lincolnshire, both of Ill., assignors to Amerace Corporation, New York, N.Y.**

**Continuation of Ser. No. 789,248, Apr. 20, 1977, abandoned. This application May 12, 1978, Ser. No. 905,461**
**Int. Cl.[2] E01F 9/04**
**U.S. Cl. 404—16** **23 Claims**




4. A pavement marker for use in snow areas for establishing on a finished roadway surface a marking visible from an oncoming vehicle while protecting the marking from damage by oncoming snowplow blades which are disposed at an angle A to the direction of travel thereof during snowplowing operations, said pavement marker comprising a base member including two longitudinally extending and laterally spaced-apart keel portions each extending below a plane and adapted to be respectively disposed and secured in first and second complementary recesses in the associated pavement with the associated roadway surface lying substantially in the plane, said base member having two laterally spaced-apart inclined upper surfaces each forming an inclined ramp having an inner edge and an outer edge and extending longitudinally of said base member from adjacent to one end thereof upwardly toward the other end thereof and rising from the plane to an uppermost portion, said outer edges of each of said inclined ramps being inclined at a first acute angle with respect to the plane, said inner edges of each of said inclined ramps being inclined with respect to the plane at a second acute angle greater than said first angle and terminating the same vertical distance above the plane as said outer edges, the difference between said first and second angles being such that an associated angled snowplow blade initially contacting one of said outer edges will remain in contact therewith along the entire length thereof as the blade passes therealong, said base member including two

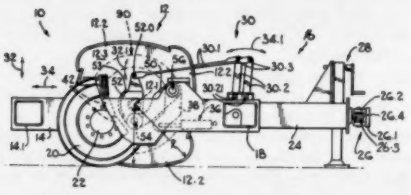
coplanar top surfaces disposed substantially parallel to the plane and respectively intersecting said inclined upper surfaces along intersection lines each disposed at a third acute angle to the direction of longitudinal extent of said base member, each of said top surfaces having a length along the inner edge thereof which is substantially equal to the lateral distance between said top surfaces multiplied by the cotangent of the angle A, said base member including a support portion interconnecting said keel portions and having a support surface thereon disposed between said inclined surfaces adjacent to the uppermost ends thereof, and signal means carried by said support surface and disposed between and below said inclined ramps so that an oncoming angled snowplow blade will ride up said ramps and be deflected from contact with said signal means as the snowplow, blade passes over said pavement marker, said signal means facing toward the low ends of said inclined ramps and extending above the plane so as to be visible from oncoming vehicles and exposed to wiping action by the tires thereof when said base member is received and secured in the complementary recesses, whereby said signal means is protected from contact with oncoming snowplow blades.

---

## 4,147,448
## METHOD OF OPERATING A COMPACTION ROLLER ASSEMBLY, AND A COMPACTION ROLLER ASSEMBLY

**Brian S. Jeffery, Krugersdorp, South Africa, assignor to The South African Inventions Development Corporation, Pretoria, South Africa**

**Filed May 12, 1978, Ser. No. 905,610**
**Claims priority, application South Africa, May 25, 1977, 77/3141; Aug. 23, 1977, 77/5113; Jan. 26, 1978, 78/0477**
**Int. Cl.[2] E01C *19/22***
**U.S. Cl. 404—124** **33 Claims**



13. A compaction roller assembly which comprises a draw frame;

a non-circular lobed compaction roller connected via its axle to the draw frame such as to follow the draw frame when the draw frame is propelled; and

restraint means mounted on the frame and slidably engagable, during rolling of the roller as it follows the frame when the frame is propelled, with at least one end of the roller at a position spaced from the roller axis, thereby to restrain undesired movement of the roller relative to the frame.

---

## 4,147,449
## PROTECTION CONDUIT LINE FOR LAYING UNDERGROUND CABLES

**Mituyosi Kato, Okazaki, Japan, assignor to Toyokon Kaihatsu Co., Ltd., Nagoya, Japan**

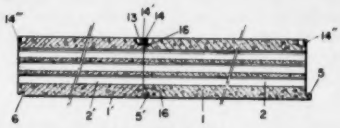
**Filed Sep. 27, 1977, Ser. No. 836,991**
**Int. Cl.[2] F16L *1/00*; E01G *5/00***
**U.S. Cl. 405—154** **6 Claims**

1. A protective pipe line for underground cables comprising concrete underground pipe units each having a body portion having front and rear end faces and being formed with a plurality of longitudinal holes extending through said body portion and engageable coupling means formed on said front and rear end faces of said units for connecting said units longitudinally aligned with one another, said holes being adapted to receive cable therethrough,

said coupling means including two first coupling means for mutual connection with each other, said two first coupling means being located adjacent a bottom of said end faces of said body portion, one of said two first coupling means forming a receiving surface at one of said end faces,

said receiving surface including a first engaging portion projecting upwardly in a direction of connection toward another of said pipe units aligned therewith with said front and said rear end faces of said units, respectively, abutting each other, and

the other of said two first coupling means including a mating surface formed at the other end face of said body portion



and formed with a second engaging portion substantially complementary to said first engaging portion of said receiving surface,

each of said end faces being formed with operation holes at a top of said end faces,

said coupling means including two second coupling means for mutual connection with each other, said two second coupling means being mounted at the top of said body portion in said operation holes of said front and rear end faces, respectively,

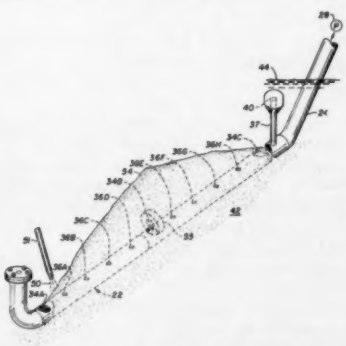
said pipe units being successively joined together in longitudinal alignment by joining said two first coupling means and said two second coupling means, respectively, with one other of aligned said units at the bottom and at the top, respectively, to form a long continuous pipe line.

---

## 4,147,450
## FIXED DREDGE CLEANOUT MEANS

**Townsend L. Schoonmaker, 265 Summit Ave., San Rafael, Calif. 94111**

**Continuation-in-part of Ser. No. 427,077, Dec. 21, 1973, Pat. No. 4,074,535. This application Dec. 30, 1977, Ser. No. 866,026**
**Int. Cl.[2] E02B *3/02***
**U.S. Cl. 405—74** **1 Claim**



1. A method of clearing dredging lines of the type having a stationary conduit submerged under a body of water near the bottom thereof and having passageways opening into the conduit and distributed along its length and a pump arranged to provide fluid streams entering the conduit through the passageways to carry water and sediment into the conduit where

at least one of said passageways is bridged by sediment providing a body at least twice as long as the distance between two passageways, wherein the method comprises the step of:

providing a series of orifices, each having an area substantially less than the area of one of the passageways, opening into the conduit and distributed between each of said passageways,

directing fluid jet streams from a manually operated source of high pressure fluid against said body of sediment adjacent to an open one of said passageways to churn the sediment and remove it through said open passageway until one of said smaller orifices is uncovered,

directing fluid jet streams against said body of sediment adjacent to the uncovered smaller orifice to draw sediment through the uncovered smaller orifice, and

continuing to direct fluid jet streams against said body of sediment to progressively uncover said orifices until said bridges passageway is uncovered.

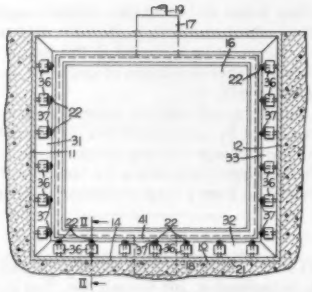
---

**4,147,451**

## APPARATUS FOR VALVE INSTALLATION IN A FLUME

**Robert H. Zeiders, York, Pa., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.**

**Filed Nov. 25, 1977, Ser. No. 854,899**
**Int. Cl.[2] E02B 7/20**
**U.S. Cl. 405—90** **1 Claim**



1. A valve for installation in a flume:

a groove liner within a groove cast when constructing the flume;

a valve body defining a fluid passage within said liner, said valve body being of a size so as not to extend outside of the flume;

a plurality of threaded studs anchored to said groove liner and extending inwardly therefrom;

wedge plates operable to engage with said valve body and the groove liner at an angle,

said wedge plates having openings which are positioned to permit passage of said studs therethrough;

force applying means operable to engage with said wedge plates to move said valve body into forceful engagement with said gasket to compress the same, said wedge plates also operating to lock said valve body within said groove liner, comprising,

bevelled washers engaged over each of the studs, said bevelled washers having a wedge plate abutting surface which is complementary to the sloping surface of said wedge plate as installed;

a threaded nut engaged on each stud in position to exert a force on the associated bevelled washer to force said wedge plate into force applying relationship between the groove liner and the valve body; and,

a valve disc pivotally supported within the fluid passage defined by said valve body for movement between an open and a fluid blocking position.

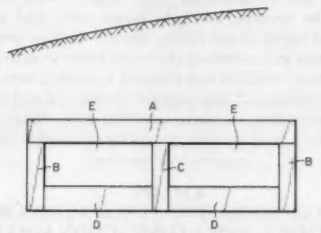
---

**4,147,452**

## METHOD FOR CONSTRUCTING A RECTANGULARLY SHAPED TUNNEL

**Toshiya Ogasawara; Norimasa Kubo, both of Ohdate; Hiroshi Nagino, Okayama; Mamoru Takeda, Okayama, and Masanori Ochiishi, Okayama, all of Japan, assignors to Dowa Mining Co., Ltd., Tokyo and Dowa Engineering Co., Ltd., Okayama, both of, Japan**

**Filed Feb. 1, 1978, Ser. No. 874,318**
**Claims priority, application Japan, Feb. 5, 1977, 52/11928**
**Int. Cl.[2] E21D 11/10**
**U.S. Cl. 405—134** **8 Claims**




1. A method for constructing a rectangularly shaped tunnel through an earth body, said method comprising:

constructing an artificial tunnel roof by:

excavating a gateway shaft through an earth body in a direction along the length of an intended tunnel;

sequentially excavating a plurality of cross cut shafts through said earth body from opposite sides of said gateway shaft in opposite lateral directions transverse to the length of the intended tunnel, and sequentially filling said cross cut shafts with concrete, whereby a given said cross cut shaft is excavated immediately adjacent a preceding said cross cut shaft after the said concrete therein has solidified; and

filling said gateway shaft with concrete, whereby said concrete filling said cross cut shafts and said gateway shaft together form an integral tunnel roof;

constructing vertical wall pillars directly beneath opposite lateral edge and central portions of said tunnel roof by:

sequentially excavating portions of said earth body directly beneath said opposite lateral edge and central portions of said tunnel roof, to thereby form vertical wall cavities extending along the length of the intended tunnel; and

filling said vertical wall cavities with concrete, to thereby form vertical wall pillars, which together with said tunnel roof cover inner block portions of said earth body;

removing said inner block portions of said earth body, to thereby form rectangularly shaped hollow tunnel chambers extending along the length of the intended tunnel; and

forming concrete layers on the bottom surfaces of said hollow tunnel chambers, to thereby form tunnel floor portions.

---

**4,147,453**

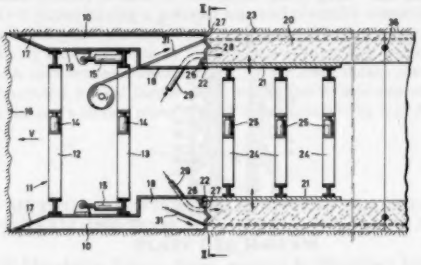
## METHOD OF, AND APPARATUS FOR, DRIVING AND LINING TUNNELS

**Eberhart Unger, Lunen; Hans Jütte, Dortmund-Brechten, and Dieter Stuckmann, Selm, all of Fed. Rep. of Germany, assignors to Gewerkschaft Eisenhutte Westfalia, Lunen, Fed. Rep. of Germany**

**Filed Feb. 15, 1978, Ser. No. 877,957**
**Claims priority, application Fed. Rep. of Germany, Feb. 15, 1977, 2706244; Jun. 8, 1977, 2725827**
**Int. Cl.[2] E21D 11/00**
**U.S. Cl. 405—141** **25 Claims**

1. A method of driving and lining tunnels, the method comprising the steps of driving a tunnel by means of a knife shield, and forming a concrete lining in the tunnel behind the knife shield, the lining being formed in sections along the tunnel,

wherein each lining section is formed by introducing concrete into an annular space formed between a shuttering and the tunnel wall, the shuttering being constituted by a plurality of elongate shuttering elements, each of which may be advanced



independently of the others and each of which is connected to a respective knife of the knife shield for conjoint advance movement therewith, and wherein the advance of a shuttering element is accompanied by the step of forcing concrete into the space between that shuttering element and the tunnel wall.

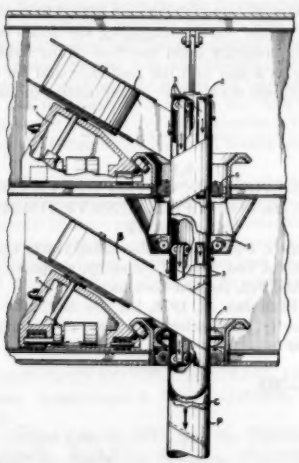
---

**4,147,454**

## METHOD OF AND APPARATUS FOR CONSTRUCTION OF PIPES FOR MARINE USE, AS FOR OCEAN MINING AND THE LIKE

**Jan-Olaf Willums, Sandvika, Norway, assignor to Nor-Am Resources Technology Incorporated, Boston, Mass.**

**Filed Oct. 23, 1975, Ser. No. 625,134**
**Int. Cl.[2] E02F *1/00*; B31C *1/00***
**U.S. Cl. 405—156** **7 Claims**



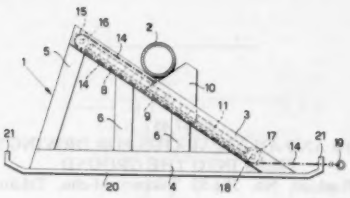
1. A method of mining materials from within the sea, that comprises forming a pipe in situ on a platform maintained at the surface of the water by wrapping webs of sheet material in overlapped fashion about a downwardly suspended vertical core on the platform to form a vertical tubular pipe, moving the pipe as it is thus formed downwardly off and free of the core in a continuous manner, and continuing the wrapping and moving steps to effect vertical lowering of the freed pipe into the water as it is thus being continuously formed until a desired depth is reached; and then cutting the formed pipe at its upper end, connecting the upper end to a pump and pumping water and mined materials through the vertical pipe at the site of pipe formation.

**4,147,455**

## ADJUSTABLE APPARATUS FOR SUPPORTING A PIPELINE LAID ON DEEP WATERS AND FOR IMPRESSING THERETO A PRESELECTED GEOMETRICAL CONFIGURATION

**Gianpaolo Bertaccini, San Donato Milanese, Italy, assignor to Snamprogetti S.p.A., Italy**

**Filed Jan. 11, 1978, Ser. No. 868,494**
**Int. Cl.[2] F16L *3/00***
**U.S. Cl. 405—172** **9 Claims**



1. Apparatus for supporting on the sea bottom and for causing a preselected geometrical configuration to be taken by a submerged pipeline suspended over a subsea vale in deep waters, comprising a single rigid structure adapted to be towed on the sea bottom to the suspended pipeline which includes:

a wide base means on the bottom of said structure for facilitating movement thereof along the sea bottom and for resting beneath the suspended section of the pipeline,

positioning means on said structure for contacting the suspended section of the pipeline when said structure has been moved therebelow,

movable means on said structure for supporting and moving upwardly the suspended section of pipeline to the preselected geometric configuration when said structure has been positioned beneath, and said positioning means is in contact with, the suspended pipeline section,

actuating means connecting said movable means for moving said movable means upwardly,

rack means operatively connected to said positioning means and to said movable means and adapted to allow upward movement of said movable means on said structure, and

locking means on said structure which cooperates with said rack means to automatically lock said movable means in position when said movable means has moved the suspended pipeline to the preselected geometric configuration.

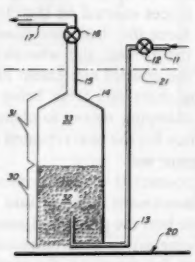
---

**4,147,456**

## STORAGE OF FUEL GAS

**Donald L. Klass, Barrington, Ill., assignor to Institute of Gas Technology, Chicago, Ill.**

**Filed Feb. 23, 1978, Ser. No. 880,600**
**Int. Cl.[2] B65G *5/00***
**U.S. Cl. 405—210** **10 Claims**



1. A method for storing fuel gas comprising: pumping fuel

gas to be stored into the lower portion of a storage vessel and forming a solid fuel gas hydrate, said vessel having closed sides and top and secured in a vertical position beneath the surface of a body of water, said vessel providing a lower zone having higher pressure, relative to the atmosphere, sufficient to cause solid hydrate formation of said fuel gas and water, said vessel providing an upper zone having lower pressure, relative to said lower zone, sufficient to cause decomposition of said solid hydrate to fuel gas and water; removing fuel gas for desired use from the upper portion of said storage vessel.

---

**4,147,457**

## METHOD AND AN APPARATUS FOR DRIVING SHEET PILES INTO THE GROUND

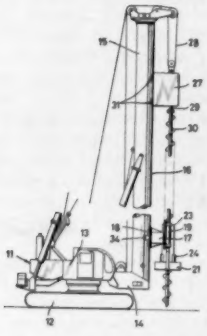
**Nobuo Washida, No. 354-53 Takenouchi-cho, Takatsuki-shi, Osaka-fu, Japan**

**Filed Jun. 10, 1974, Ser. No. 478,162**

**Claims priority, application Japan, Jun. 28, 1973, 48/73938; Aug. 13, 1973, 48/91826**

**Int. Cl.[2] E02B *7/20***

**U.S. Cl. 405—232** **3 Claims**



1. An apparatus for driving a sheet pile into the ground comprising:

a vertical support;

jack means fixed to and elevatably adjustable along said vertical support for supplying repeated upward and downward force to drive the pile;

clamping means operatively connected to said jack means for movement with the downward and upward motion of the jack means, for repeatedly clamping therein said sheet pile during the downward motion of the jack means, and for repeatedly releasing said sheet pile means during the upward motion of the jack means, whereby the repeated downward forces exerted on the clamping means by the jack means force the sheet pile clamped by the clamping means into the ground, and whereby release of the sheet pile during the upward movement of the clamping means prevents the sheet pile from being drawn upward and allows the clamping means to clamp the sheet pile at a higher position for the next repeated downward motion of the jack means; and

auger means connected to said vertical support above and extending downward through said clamping means for boring a hole into the ground adjacent the position where the pile is being driven simultaneously with the driving of the pile, and for returning the earth removed from the hole back into the hole after the pile is in position in the ground.

**4,147,458**

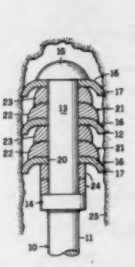
## ROOF PIN

**Gerald W. Elders, 38 Yakashba Estates, Prescott, Ariz. 86301**

**Filed Jun. 20, 1977, Ser. No. 807,871**

**Int. Cl.[2] E21D *21/00***

**U.S. Cl. 405—259** **6 Claims**



1. A roof pin for insertion into a preformed hole in a roof comprising:

(a) an elongate rod,

(b) a strata-gripping assembly including:

(1) a plurality of locking discs mounted on and carried by one end of the rod, the locking discs being of resilient steel and having a periphery adapted to engage the strata defining the roof pin hole, and

(2) spacer means mounted on and carried by the rod end, and located between and engaging each axially adjacent pair of locking discs, the spacer means having a periphery located radially inward of the locking disc periphery,

(c) retaining means on the rod at opposite ends of the strata-gripping assembly for holding the discs and spacer means on the rod, and

(d) the locking discs peripheries are turned toward the opposite end of the rod for engaging the strata and flexing resiliently inwardly upon insertion of the strata-gripping assembly as a unit into the roof hole and for expanding outwardly into the strata upon application of load force on the pin.

---

**4,147,459**

## SHIFTING DEVICE CONNECTED WITH A LONGWALL CONVEYOR FOR A PROGRESSIVE TIMBERING FRAME

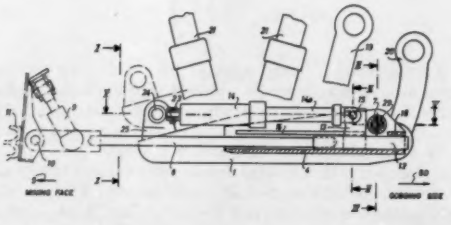
**Manfred Koppers, Duisburg-Hamborn, and Harry Oppenländer, Wetter, both of Fed. Rep. of Germany, assignors to Thyssen Industrie AG, Fed. Rep. of Germany**

**Filed Jan. 12, 1978, Ser. No. 868,752**

**Claims priority, application Fed. Rep. of Germany, Feb. 8, 1977, 2705140**

**Int. Cl.[2] E21D *23/00***

**U.S. Cl. 405—303** **3 Claims**



1. A timbering device connected to a longwall conveyor disposed toward the mining face of an excavation for progressively timbering frames from the gobbing side toward the mining face, comprising first and second skids adapted to be

shifted over the floor, a guide piece, pivot means pivotally connecting said guide piece to only one of said skids adjacent the gobbing side, said guide piece having a guide slot extending toward the mining face, a push rod having one end connected to the longwall conveyor and an opposite end having a slide piece portion slidable in said guide piece guide slot, a thrust drive piston having a gobbing side end pivotally connected to said slide piece portion of said push rod and having an opposite mining face end partially connected to the mining side end of both said first and second skids, and bracket means pivotally connected to said thrust drive piston and to said one of said skids, and a sliding plane control device carried by said pusher rod.

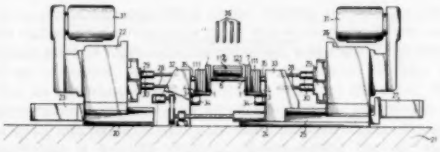
---

**4,147,460**

## METHOD FOR PIERCING DOUBLING PLATE FOR H-BEAM AND TOOL FOR PROCESSING DOUBLING PLATE FOR H-BEAM

**Eiji Miyakawa, Tokyo, Japan, assignor to Miyakawa Industry Company Limited, Seki, Japan**

**Filed Oct. 11, 1977, Ser. No. 840,678**
**Claims priority, application Japan, Nov. 8, 1976, 51/133947**
**Int. Cl.[2] B23B *35/00*; B23Q *3/06***
**U.S. Cl. 408—1 R** **18 Claims**



1. A method for piercing double plates for H-beams by utilizing a multiple spindle H-beam piercing mill in which from at least two faces among both the side faces and the upper face the piercing operation is possible and a tool having a substantially H-shaped section and being capable of being set and supported on said piercing mill, said method comprising fixing double plates for an H-beam to at least one face among both the side faces and the upper face of said tool and piercing said double plates with the same drill arrangement as that to be used for piercing the H-beam to which said double plates are to be attached.

3. A tool for processing double plates, which comprises a pair of vertical side plates to be set on supporting rollers of a multiple spindle H-beam piercing mill, a horizontal supporting plate connecting said side plates, a setting portion outwardly projected from the lower portion of at least one of said side plates, and fixing means for fixing double plates set on the top face of said setting portion.

---

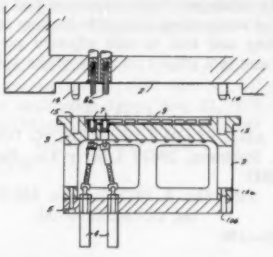
**4,147,461**

## MULTIPLE SPINDLE DRILLING UNIT

**Dieter Maier, Schulstrasse 4, 7911 Burlafingen, Fed. Rep. of Germany**

**Filed Feb. 22, 1977, Ser. No. 770,934**
**Claims priority, application Fed. Rep. of Germany, Feb. 27, 1976, 2608141**
**Int. Cl.[2] B23B *39/18***
**U.S. Cl. 408—46** **14 Claims**

1. A multiple spindle machine comprising a drive unit including a housing having a coupling face, a plurality of drive shafts mounted in said housing uniformly spaced from each other in a predetermined pattern and projecting outwardly from said coupling face, speed change gears in said housing connected to said drive shafts, and drive means for driving said speed change gears; at least one drilling head unit having a counter coupling face provided with a plurality of bores equal in number to said plurality of drive shafts and arranged uniformly spaced from each other in the same pattern as said drive shaft, a plurality of coupling elements turnably mounted in at least some of said bores in said counter coupling face, tool spindle carrier means mounted on said drilling head unit on a face opposite said counter face, a plurality of tool spindles, equal in number to said plurality of coupling elements which are inserted into said bores, rotatably mounted in said tool spindle carrier means and projecting outwardly therefrom, and a plurality of universal joint shafts respectively coupling said coupling elements to said tool spindles, said drilling head unit adapted to be provided with the desired number of coupling elements and drilling spindles connected thereto in any desired



drilling pattern while being separated from said drive unit; first means for moving the thus set-up drilling head unit in a direction normal to the drive shafts to a position in which said counter coupling face of the drilling head unit is parallel and spaced from said coupling face with said drive shafts respectively aligned with said bores in said counter coupling face; and second means for moving one of said units in the axial direction of the drive shafts towards the other unit so as to move drive shafts into coupling engagement with corresponding coupling elements.

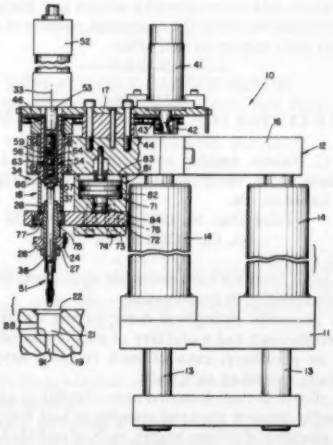
---

**4,147,462**

## MACHINE FOR FINISHING VALVE SEATS

**J. Robert Appleby, Corunna; Frank P. Horvath, Owosso, both of Mich., and William J. Morris, deceased, late of Flint Township, Genesse-County, Mich. (by Charles F. Morris, administrator), assignors to Neway Manufacturing, Inc., Corunna, Mich.**

**Filed Oct. 25, 1977, Ser. No. 845,310**
**Int. Cl.[2] B23B *41/12*; B24B *19/26***
**U.S. Cl. 408—80** **13 Claims**



1. In a valve-seat finishing machine, including a frame, a head structure slidably supported on said frame for linear

reciprocating movement along a selected direction, and at least one spindle assembly mounted on said head structure and extending substantially parallel to said selected direction for permitting finishing of a valve seat, said spindle assembly including a driving member supported for rotation about a driving axis which is substantially parallel with said selected direction, a tool which is substantially aligned with said driving member and is rotatable about a tool axis which is approximately aligned with said driving axis, and coupling means drivingly connecting said driving member to said tool (1) for permitting driving of said tool and (2) for permitting said tool axis to move into an adjusted position wherein it is angularly and laterally misaligned with respect to said driving axis, the improvement comprising releasable locking means for selectively holding said tool in said adjusted position, whereby rotation of said tool effects finishing of the valve seat.

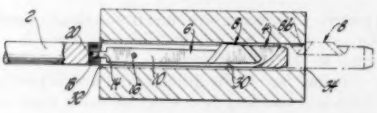
---

**4,147,463**

## ADJUSTABLE DEBURRING TOOL

**William R. Robinson, 25435 Liberty La., Farmington Hills, Mich. 48018**

**Filed Oct. 3, 1977, Ser. No. 838,701**
**Int. Cl.² B23B *51/00***
**U.S. Cl. 408—156** **5 Claims**



1. A deburring tool comprising:

an elongated arbor formed with a cutting blade recess; a unitary cutting tool having a cutting head with an elongated, flat, resilient blade extending therefrom and received in said recess; and mounting means securing the end of said blade opposite said cutting head to said arbor with said cutting blade projecting from said recess and the portion of said blade extending from said mounting means being yieldable to permit said cutting head to move inwardly with respect to said recess, said mounting means comprising a pin mounted in said arbor and extending transversely through said recess and said blade to define a pivot point about which said cutting tool can pivot, and an adjustable screw threadedly mounted in said arbor at a location spaced from said pin with its axis extending transversely of said arbor and normal to said pin, said blade being connected with said screw such that rotation of said screw in said arbor pivotally adjusts said blade about said pivot point to adjust the unstressed position of said cutting head with respect to said arbor.

---

**4,147,464**

## HOLE CUTTER FOR HARD MATERIALS SUCH AS CERAMIC TILE

**Wayne C. Watson, Ambler, and Jonas W. Weisel, Line Lexington, both of Pa., assignors to American Olean Tile Company, Inc., Lansdale, Pa.**

**Filed Mar. 16, 1978, Ser. No. 887,139**
**Int. Cl.² B23B *41/02, 51/00***
**U.S. Cl. 408—206** **6 Claims**

1. A hole cutter for hard materials, such as ceramic tile, said cutter comprising, in combination,

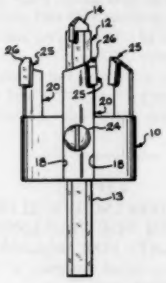
(a) a generally cylindrical body having an axial opening therethrough and a plurality of axially extending recesses in its periphery, each of such recesses having parallel axially extending side walls,

(b) a pilot drill shaft mounted non-rotatably in and extending axially through the axial opening in said body,

(c) a plurality of cutting blades, each of said blades having an axially extending shank of arcuate cross-section that is adapted to fit into one of the recesses in said body,

(d) a cutting tip on each of said shanks, said tip having a rearwardly raked end and a beveled, radially outward side,

(e) means for releasably securing said body on said pilot drill shaft, and



(f) means for removably securing said cutting blades in the recesses in said body.

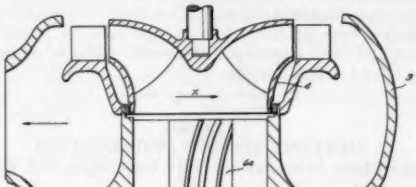
---

**4,147,465**

## MEANS FOR ABRUPTLY TERMINATING THE FLOW OF FLUID IN CLOSED FLUID CIRCUIT SYSTEMS OF NUCLEAR REACTOR PLANTS OR THE LIKE

**Otto Schiele, Neustadt, Fed. Rep. of Germany, and Dusan Florjancic, Winterthur, Switzerland, assignors to Klein, Schanzlin & Becker Aktiengesellschaft, Frankenthal/Pfalz, Fed. Rep. of Germany**

**Continuation-in-part of Ser. No. 394,210, Sep. 4, 1973, Pat. No. 4,073,595. This application Aug. 26, 1977, Ser. No. 828,227**
**Claims priority, application Fed. Rep. of Germany, Sep. 2, 1972, 2243365**
**Int. Cl.² F03B *15/06***
**U.S. Cl. 415—143** **3 Claims**



1. In a closed circuit for the circulation of a fluid, particularly in the primary cooling circuit of a nuclear reactor plant, wherein the fluid is circulated by at least one centrifugal pump which operates without cavitation at normal system pressure, the improvement which conists in the provision of an arrangement for effecting the operation of said pump with full cavitation in response to a drop of said system pressure below said normal pressure to stop circulation of the fluid when a leak occurs in the primary cooling system, said arrangement including means for influencing the net positive suction head of said pump over the entire range of fluid flow, said means comprising a stationary guide wheel installed upstream of said pump.

4,147,466

## ARRANGEMENT FOR MAINTAINING OPTIMUM MINIMUM OPERATING CLEARANCE BETWEEN ROTOR AND STATOR COMPONENTS OF FLUID-FLOW MACHINES AND THE LIKE

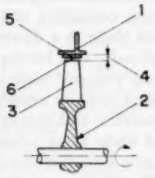
Josef Zboril, Fislisbach, Switzerland, assignor to BBC Brown, Boveri & Company Limited, Switzerland

Continuation of Ser. No. 700,449, Jun. 28, 1976, Pat. No. 4,083,650, which is a continuation of Ser. No. 483,076, Jun. 25, 1974, abandoned. This application Sep. 8, 1977, Ser. No. 831,641

Claims priority, application Switzerland, Jun. 29, 1973, 5487/73

Int. Cl.[2] F01D *11/08*

U.S. Cl. 415—174 2 Claims




1. In a machine operating under varying operating conditions and which incorporates rotor and stator components and wherein a space is provided intermediate a surface of the rotor and an oppositely located surface of the stator thereby to define an operating clearance therebetween for the rotor, the improvement comprising an abradable element interposed in said space and partially filling the same, said abradable element constituting a growth element compensating for its own growth or wear in order to maintain said operating clearance at a size promoting efficient operation of the machine throughout its varying operating conditions, and said growth element growing irreversibly under the operational conditions of the machine to thereby compensate for repeated abrasion or wear to which said growth element is subjected to during operation of the machine throughout its verying operating conditions.

4,147,467

## EXHAUST GAS TURBOCHARGER

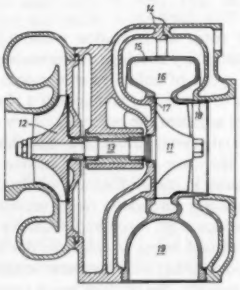
Werner Leicht, Stetten, and Georg Ruetz, Immenstaad, both of Fed. Rep. of Germany, assignors to Motoren- und Turbinen-Union Friedrichshafen GmbH, Fed. Rep. of Germany

Filed Aug. 16, 1977, Ser. No. 825,041

Claims priority, application Fed. Rep. of Germany, Sep. 4, 1976, 26399837

Int. Cl.[2] F04D *7/02*

U.S. Cl. 415—196 10 Claims




1. An exhaust gas turbocharger for internal combustion engines, comprising a turbine wheel means traversed by exhaust gases radially from the outside toward the inside and a water-cooled housing means, characterized in that an insert means of heat-resistant steel which is of annular shape is arranged radially about the turbine wheel means between the turbine wheel means and the housing means, said insert means forming the outer fixed turbine covering and taking over the guidance of the exhaust gases during entry into and discharge out of the turbine wheel means.

4,147,468

## IMPELLER TYPE PUMP HAVING SEAL MEANS AND PROTECTIVE MEANS

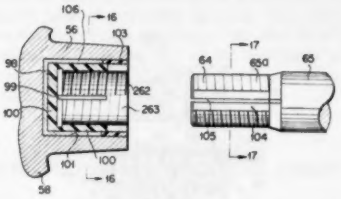
Yoshio Murakami, Tanashi, and Takezo Nakazawa, Higashi, both of Japan, assignors to Mitsui Mining & Smelting Co., Ltd. and Mitsui Kinzoku Engineering Service Co., Ltd., both of Tokyo, Japan

Division of Ser. No. 641,525, Dec. 17, 1975, Pat. No. 4,099,890. This application Oct. 27, 1977, Ser. No. 845,963

Claims priority, application Japan, Aug. 21, 1975, 50-115143; Sep. 30, 1975, 50-133444; Sep. 30, 1975, 50-133445

Int. Cl.[2] F04D *29/20*

U.S. Cl. 415—213 R 6 Claims




1. An impeller type pump comprising:

a pump body;

a pump chamber defined in the pump body;

an impeller disposed in the pump chamber and having a center shaft; and

a hollow cylindrical connector which is mounted in the center shaft of the impeller and has formed therein internal screw threads engageable with an externally screw-threaded portion formed on an end of a drive shaft for rotating the impeller, said connector being provided with thermal expansion-absorbing slits arranged in equally spaced relation along the circumference of the connector and extending lengthwise of the connector with an unslit portion left on that end of the connector which is closest to the other end of the drive shaft.

4,147,469

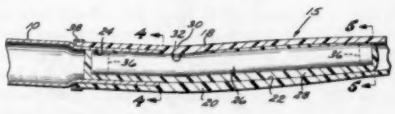
## REPLACEABLE PADDLE BLADE

Charles W. Sherberne, 3409 S. Patton Ave., San Pedro, Calif. 90731

Filed Oct. 13, 1977, Ser. No. 841,695

Int. Cl.[2] B63H *16/04*

U.S. Cl. 416—70 R 5 Claims




1. A paddle blade adapted to be mounted to a tubular handle, said blade comprising:

a blade body including a hollow, longitudinally extending reinforcing rib whose inner walls define an elongated recess having a cylindrical inner end portion adapted to closely receive the end of the tubular handle, and an

outwardly extending main portion in communication with said end portion;

a tubular element located within said recess end portion and extending into said recess main portion, and having a transverse cross sectional area less than that of either said recess end portion or said recess main portion thereby to define spaces adjacent said element; and

reinforcement means disposed about said element and engaging the inner walls of said recess main portion, said reinforcement means extending into said recess end portion in uniformly spaced relation to the inner walls of said recess end portion to thereby define an annular socket for receiving the end of the tubular handle.

---

**4,147,470**

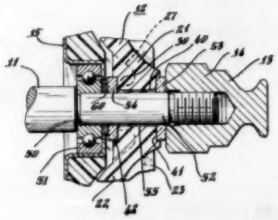
**INSULATED FAN FOR ELECTRIC APPLIANCE**

**Joseph F. Brooks, and Robert W. Elderton, both of Bloomington, Ill., assignors to National Union Electric Corporation, Greenwich, Conn.**

**Filed Jan. 31, 1977, Ser. No. 763,803**

**Int. Cl.[2] F04D *29/28***

**U.S. Cl. 416—95** **5 Claims**



1. In a fan for a vacuum cleaner, wherein the fan has a base portion including a hub, and a plurality of fins extending from said base portion, and a coaxial mounting hole extending through said hub, the improvement wherein said base portion and fins comprise a unitary member of a plastic material, said hub having an annular recess at each end of said mounting hole and coaxial with said hole, and a separate flat thermally insulating washer mounted in each said recess with a close fit, said washers having inner diameters less than that of said mounting hole and thicknesses greater than the depths of said recesses.

---

**4,147,471**

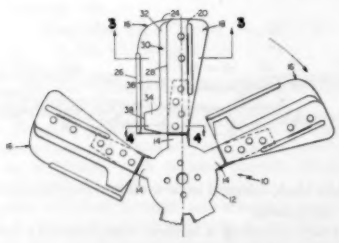
**AUTOMOTIVE COOLING FAN WITH BIASED FLEXIBLE BLADES**

**Herbert N. Charles, Chatham, Canada, assignor to Fram Corporation, East Providence, R.I.**

**Filed Oct. 19, 1977, Ser. No. 843,564**

**Int. Cl.[2] F04D *29/38***

**U.S. Cl. 416—132 A** **7 Claims**



1. An automotive cooling fan comprising a hub and a plurality of fan blade assemblies, each assembly comprising: an arm extending radially outwardly from said hub, and a flexible, resilient blade connected to said arm, said blade extending radially from a root portion adjacent said hub to a tip portion remote from said hub and extending transversely from a leading portion adjacent said arm to a trailing edge, relative to the direction of fan rotation, said arm, and said blade curved between said leading portion and said trailing edge presenting a convex surface on the upstream side, defined by the direction of airflow, and a concave surface on the downstream side of said blade, said blade adapted to decamber in an upstream direction with increasing rotational speed, characterized in that said assembly also comprises:

a flexible, resilient biasing member connected to said arm on the upstream side of said blade; said biasing member curved in a downstream direction on a smaller radius than that of said blade, contacting said blade behind said arm and biasing said blade in a downstream direction when said fan is stationary; said biasing member comprising a root portion overlying said blade root portion of an outer portion extending radially outwardly from said biasing member root portion; said biasing member outer portion contacting said blade along a line generally radially extending outwardly from said root portion at a first limited distance behind said arm and said biasing member root portion contacting said blade root portion at a second limited distance behind said arm greater than said first distance.

---

**4,147,472**

**TURBINE ROTOR**

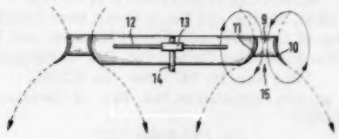
**Alberto Kling, Seestr. 38, 8131 Berg, Fed. Rep. of Germany**

**Filed May 25, 1977, Ser. No. 800,330**

**Claims priority, application Fed. Rep. of Germany, Apr. 7, 1977, 2715729**

**Int. Cl.[2] F03D *1/06***

**U.S. Cl. 416—193 R** **7 Claims**



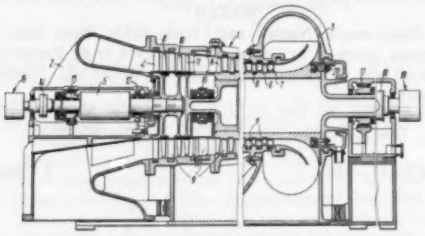
1. A turbine rotor for operation without the influence of flow-guiding stationary housings or channels in a flow medium contained in a space of unlimited dimensions as compared to the dimensions of the rotor, comprising a shroud attached to the rotor blades adjacent the outer periphery of said rotor and formed as an axialy symmetrical outer annular shroud rotating in unison with the rotor and an inner annular shroud attached to the rotor blades in radial distance within the outer annular shroud, both annular shrouds in radial section having profiles adapted to produce a lift force under onflow conditions, said inner annular shroud being attached to the inner ends of the rotor blades and together with the outer annular shroud delimits an annular passage, the profiles being oriented in the inner and outer annular shrouds respectively such that their suction sides are facing the passage and that the effective angles of attack of said profiles with respect to a direction parallel to the central axis of said passage are smaller than the respective critical (stalling) angles of said profiles.

4,147,473

## METHOD OF REGULATING MULTISTAGE AXIAL COMPRESSOR OUTPUT AND AN AXIAL COMPRESSOR FOR CARRYING SAME INTO EFFECT

Gimn V. Bufalov, ulitsa Babushkina, 8, kv. 117; Kir B. Sarantsev, Zanevsky prospekt, 43, kv. 69; Gennady I. Bogoradovsky, Bolshoi prospekt, P.S. 61/3, kv. 35; Vladimir I. Titensky, ulitsa Dybenko, 25, korpus 3, kv. 186; Alexei V. Stolyarov, Tovarischesky prospekt, 1, korpus 1, kv. 249; David M. Bavelsky, ulitsa Karbysheva, 4, korpus 1, kv. 137, and Alexandr A. Burdin, ulitsa Shelgunova, 43, kv. 15, all of Leningrad, U.S.S.R.

Filed Jan. 3, 1977, Ser. No. 756,540
Claims priority, application U.S.S.R., Jan. 4, 1976, 2307603
Int. Cl.[2] F04B *49/00*
U.S. Cl. 417—53 7 Claims



1. An axial flow compressor comprising, two coaxial, axial flow rotors mounted in series as an upstream rotor and a downstream rotor for independent rotation, means mounting said two rotors for rotation independently of each other, a housing common to both rotors and having fixed stator vanes thereon, each rotor having fixed rotor vanes defining compression stages with said stator vanes for compressing a gaseous fluid, separate drive means for driving the two rotors independently at different speeds at a variable speed of the upstream rotor greater than a constant speed of the downstream rotor and in a direction for effecting an output head pressure in the upstream rotor within a range effective to provide for varying compressor volumetric output flow over a wide range at a given constant output delivery pressure of the compressor and while optomizing the power input of said drive means.

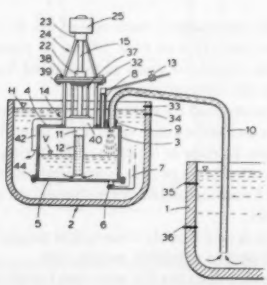
---

4,147,474

## METHOD AND SYSTEM FOR TRANSFERRING LIQUID MEDIA

Ivar D. Heimdal, and Ivar Skreosen, both of Porsgrunn, Norway, assignors to Norsk Hydro a.s, Oslo, Norway

Filed Dec. 20, 1977, Ser. No. 862,321
Claims priority, application Norway, Dec. 28, 1976, 764369
Int. Cl.[2] B67C *3/16;* F04F *3/00*
U.S. Cl. 417—54 11 Claims



1. A method for transferring a liquid medium (hereafter referred to as "liquid"), particularly liquid metal, such as magnesium, from a supply to a receiver, comprising locating at least one suction pump in the receiver, covering at least the outlet of the pump with liquid in the receiver, establishing and maintaining within the receiver an enclosed buffer zone in shape of a two phase liquid/gas zone between the pump and the supply, pumping the liquid by means of said suction pump from the liquid phase of the buffer zone for establishing suction pressure (vacuum) in the gas phase of the buffer zone for drawing by suction the liquid from the supply through the gas phase into the buffer zone.

3. A pumping system for transferring a liquid medium (hereafter referred to as "liquid"), particularly liquid metal, such as magnesium, from a supply to a received, comprising a rotary pump with a vertical rotor shaft, a closed buffer receptacle having a top and a bottom and which can be subjected to inner suction pressure and having a liquid inlet in the upper portion thereof and a liquid outlet in the lower portion thereof, means connecting the outlet of the buffer receptacle with the inlet of the pump, means for connecting the inlet of the buffer receptacle with the liquid supply, the pump having an downwardly directed axial inlet, a centrifugal pump rotor, a rotor housing, and a plurality of outlet ports extending substantially radially in a peripheral wall of the rotor housing, the pump being arranged on the top of said receptacle, the inlet of the pump being connected with the interior of the receptacle near the bottom thereof through a pipe conduit extending through said receptacle top.

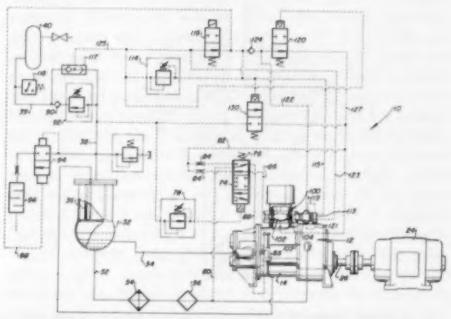
---

4,147,475

## CONTROL SYSTEM FOR HELICAL SCREW COMPRESSOR

John C. Shoop; Roger L. Post, and Michael G. Herschler, all of Quincy, Ill., assignors to Gardner-Denver Company, Dallas, Tex.

Division of Ser. No. 685,229, May 11, 1976, Pat. No. 4,052,135.
This application Sep. 6, 1977, Ser. No. 830,558
Int. Cl.[2] F04B *49/02, 49/08*
U.S. Cl. 417—310 4 Claims



1. A helical screw compressor and control system comprising in combination:

a helical screw gas compressor operably connected to a service line for delivering compressed gas to said service line, said compressor being characterized by a casing having a pair of parallel intersecting bores, an inlet port, and a discharge port, a pair of intermeshing helical screw rotors disposed in said bores and forming variable volume chambers;

capacity control valve means movable to vary the effective displacement volume of said variable volume chambers to regulate the flow of compressed gas through said compressor;

a pressure fluid operated actuator connected to said capacity control valve means and including a pair of opposed fluid chambers and piston means disposed in said fluid chambers and responsive to pressure fluid in said fluid chambers

for moving said capacity control valve means, said control system including:

a four-way valve including actuating means for moving said four-way valve between first and second positions;

pressure fluid supply and return conduits connected to said four-way valve;

conduits leading to each of said fluid chambers from said four-way valve; and,

pressure sensing means responsive to the pressure condition in said service line for providing a first pressure signal to said actuating means corresponding to a predetermined maximum pressure in said service line for moving said control valve to said second position blocking the flow of pressure fluid to both fluid chambers of said actuator, and said actuating means is responsive to receiving a second pressure signal from said sensing means corresponding to a variation in the pressure in said service line from said predetermined maximum pressure for moving said control valve to said first position to conduct pressure fluid to one of said fluid chambers and from the other of said fluid chambers to effect movement of said capacity control valve means to regulate the flow of gas through said compressor to substantially maintain the pressure in said service line at said predetermined maximum pressure.

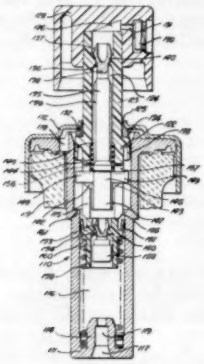
---

**4,147,476**

## PUMP ASSEMBLY FOR AN ATOMIZING PISTON PUMP

**William E. Warren, Cuffley, England, assignor to Bespak Industries Limited, England**

**Continuation of Ser. No. 560,899, Mar. 21, 1975, abandoned.**
**This application Feb. 21, 1978, Ser. No. 879,521**
**Claims priority, application United Kingdom, Mar. 28, 1974, 13789/74**
**Int. Cl.[2] F04B *17/00***
**U.S. Cl. 417—328** **21 Claims**



1. A pump assembly for an atomizing piston pump and comprising: a first cylinder; a first piston located in the first cylinder to define a first variable volume space; a second cylinder coaxial with the first cylinder and in communication therewith; a second piston of smaller piston area than the first piston slidably located in the second cylinder to define a second variable volume space, in communication with the first space; a fluid inlet to the end of the second cylinder remote from the first cylinder; a fluid flow passage through the first piston; spacing means comprising a tubular extension of the first piston formed coaxially and integrally therewith and extending towards the second piston for maintaining a certain minimum distance between the first and second pistons; first valve means for opening and closing the fluid flow passage, said valve means opening in the direction of fluid flow through the fluid flow passage; second valve means for opening and closing the fluid inlet; first biasing means urging the first valve means into a position closing the passage; second biasing means urging the second piston towards a position corresponding to the minimum volume of the second volume space; an axial extension of the first valve means; a striker plate comprising two fingers extending radially of the axial extension through slots formed in the tubular extension of the first piston; and fixed means comprising a shoulder formed at the junction of the first and second cylinders, the arrangement being such that the striker plate co-operates with the shoulder to open the first valve means only after a predetermined amount of movement greater than zero of the first piston relative to the first cylinder.

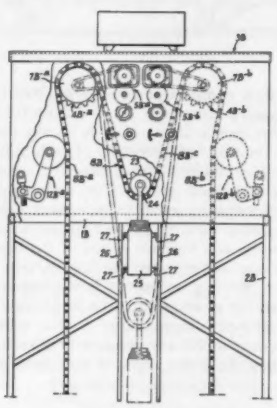
---

**4,147,477**

## PUMPING APPARATUS PARTICULARLY FOR OIL WELLS

**Joel Chardonneau, Nantes, and Claude Sable, Reze, both of France, assignors to Centre d'Exploitation et de Recherche Industrielle d'Application de Brevets (CERIAB), Nantes, France**

**Division of Ser. No. 584,284, Jun. 6, 1975, Pat. No. 4,063,825.**
**This application Nov. 22, 1977, Ser. No. 853,882**
**Int. Cl.[2] F04B *17/00***
**U.S. Cl. 417—343** **5 Claims**



1. Pumping apparatus for the extraction of fluid material, such as petroleum, from two wells comprising:

a pair of spaced shaft-mounted rotatable means positioned for rotation in a substantially vertical plane;

flexible connection means passing over said rotatable means in operative relationship therewith and having ends extending downwardly from sides of the respective rotatable means opposite those defining the space between said pair;

a train of rods connected to each end of the flexible connection means, said train of rods joined to pumps being located within respective wells and mounted for reciprocating vertical movement therein;

means for rotating said rotatable means alternately in clockwise and counterclockwise directions whereby when one of said trains of rods is lifted by said flexible connection means, the other train of rods is lowered, the lifting of said one train of rods being aided by the weight of said other train of rods;

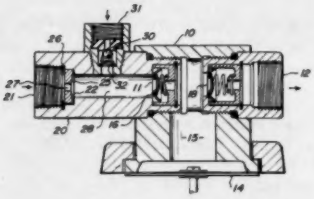
a loop formed in said flexible connection means intermediate the spaced pair of rotatable means; and

a resistant device operatively associated with said loop for applying a force to the loop in a direction parallel to the downwardly extending ends of the flexible connection means.

## 4,147,478
## SECONDARY PUMP FEED APPARATUS

William D. Vork, Edina, Minn., assignor to Graco Inc., Minneapolis, Minn.

Filed Sep. 22, 1977, Ser. No. 835,686
Int. Cl.[2] F04B 21/02
U.S. Cl. 417—458 4 Claims



1. An apparatus for connecting to a positive displacement pump for providing the metered introduction of a secondary liquid to the primary liquid delivered by the pump, comprising:

(a) a housing for permitting primary liquid flow therethrough, said housing having an internal shoulder and a downstream passage of reduced diameter;

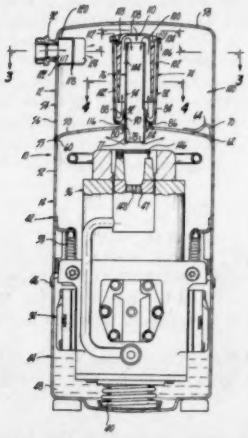
(b) a resilient member seated on said shoulder, said resilient member having an orifice therethrough of lesser size than said housing downstream passage and further sized to restrict fluid flow therethrough to a lesser quantity than the peak pump flow delivery rate; and

(c) a secondary inlet in said housing downstream of said resilient member, said secondary inlet having a one-way check valve therein to permit liquid flow toward said housing and to restrict reverse liquid flow.

## 4,147,479
## REFRIGERATION SYSTEM AND METHOD WITH COMPRESSOR MOUNTED ACCUMULATOR

Robert L. Morse, Adrian, Mich., assignor to Tecumseh Products Company, Tecumseh, Mich.

Continuation-in-part of Ser. No. 714,050, Aug. 13, 1976, abandoned. This application Oct. 31, 1977, Ser. No. 846,702
Int. Cl.[2] F04B 11/00; B01D 45/12; F25B 43/00
U.S. Cl. 417—540 18 Claims

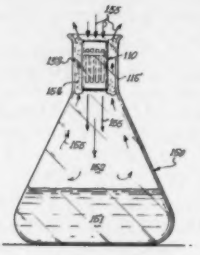


1. A combined hermetic compressor and suction accumulator unit comprising a refrigerant compressor including an electric motor and gas pump driven thereby, a hermetically sealed first casing enclosing said compressor pump and motor and having a top wall disposed thereabove in the normal operational orientation of said compressor, a suction accumulator comprising a second casing superimposed on said first casing and having a peripheral side wall and a top wall joined to said side wall and closing the upper end of said second casing, said side wall having a lower edge joined to said first casing such that said first casing top wall closes the lower end of said second casing to define a reservoir for refrigerant fluid, suction return line inlet means entering said second casing with an orientation to induce a whirling flow of refrigerant fluid in said reservoir generally concentric with the upright axis of said second casing, a gas-liquid separating standpipe means disposed within said reservoir of said second casing and having a gas outlet extending through said first casing top wall and communicating said reservoir with an inlet to said gas pump.

## 4,147,480
## ASYMMETRIC PERMEABLE MEMBER

Daniel H. Deutsch, 141 Kenworthy Dr., Pasadena, Calif. 91105

Filed Aug. 19, 1977, Ser. No. 825,947
Int. Cl.[2] F04B 39/00
U.S. Cl. 417—572 98 Claims



1. A gas circulating system comprising:

a gas;

at least one hollow member of a relatively gas impermeable material, positionable within a gas impervious chamber, and wherein said chamber has two sets of conduits attached to it so as to form a gas-tight seal between the conduits and the chamber so that gas may flow between the chamber and said conduits unimpaired, and wherein the first set of conduits has at least one unit and the second set of conduits has at least one unit, and said hollow member is open on at least one end, and wherein all of the open ends of the hollow member are connected, gas tight, to the first set of conduits so as to form a barrier to the unrestricted flow of gas between the said first set of conduits and the said second set of conduits, and wherein the individual conduits making up any one given set of said conduits may be interconnected with other conduits to the same set outside the chamber, and wherein the open ends of at least two of said hollow members may be interconnected, gas tight, inside said chamber, by a channel with gas impervious walls except where the open ends of said hollow member connect to the channel, and except where at least one unit of said first set of conduits is connected, gas tight, to said channel so as to form an unimpaired passage for the flow of gas between the inside of said hollow member and the said first set of conduits and so that the only passage for the flow of gas between the said first set of conduits and the said second set of conduits is through the wall of the said hollow member, and wherein the wall of said hollow member has a thickness of less than about 3 millimeters and greater than about 0.001 micron, and wherein said wall contains a multiplicity of uniform tapered holes passing from first surface of the wall of said hollow member to the second surface of the wall of said hollow member, and wherein a substantial majority of the tapers of the holes are aligned so that the smaller openings are on one of the continuous surfaces of the wall and the

larger openings are on the opposite continuous surface of the wall, and wherein the distance across the smaller openings of the holes is less than three times the mean free path of the molecules of the gas which is to be employed with this gas circulating system, at its operating temperature and pressure, and larger than the minimum diameter of said gas molecules, and wherein the hollow member is less than about 10 centimeters in diameter when extended in the form of a circular cylinder, and wherein the inside perimeter of said hollow member, perpendicular to the axis of said hollow member, is less than about 32 centimeters, and wherein the said hollow member, the said chamber, and the said conduits are all both chemically and physically stable to the gas which is to be employed with this gas circulating system, and wherein the material of said hollow member, the said chamber and the said conduits are all relatively nonvolatile under the conditions of temperature and gas pressure which are to be employed with this gas circulating system, and wherein the mean absolute effusional resistance coefficient, $\xi$, of the wall of said hollow member, is greater than $10^{-4}$ and less than 2.0 in the gas to be circulated, and whereby when said hollow member is positioned within said chamber so as to separate the said two sets of conduits attached to said chamber so as to form a gas-tight barrier to the flow of gas between the first said set of conduits and the second said set of conduits, and said chamber and said hollow member and said set of conduits are all filled with said gas, at operating temperature and pressure the gas is urged through said hollow member and through said chamber and through said first set of conduits and through said second set of conduits.

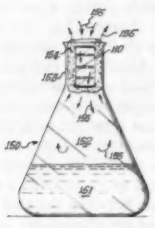
---

**4,147,481**

## ASYMMETRIC PERMEABLE MEMBER

**Daniel H. Deutsch, 141 Kenworthy Dr., Pasadena, Calif. 91105**

**Filed Aug. 19, 1977, Ser. No. 826,270**
**Int. Cl.[2] F04B *39/00***
**U.S. Cl. 417—572** **125 Claims**



**1.** A gas circulating system comprising;

at least one sheet of a relatively gas impermeable material positionable within a gas impervious conduit and attachable to said conduit in such a manner as to form a gas-tight seal across the conduit, and said sheet has a thickness of less than about 3 millimeters and greater than about 0.001 micron, and contains a multiplicity of tapered holes passing from one surface of the sheet to the other surface, wherein a substantial majority of the holes are aligned so that they have their smaller openings on the first surface of the sheet and their larger openings on the second surface of the sheet and wherein the distance across the smaller openings is less than three times the mean free path of the molecules of the gas which is to be employed with this gas circulating system and larger than the minimum diameter of such gas molecules, and wherein the sheet is both chemically and physically stable to the gas which is to be employed with this gas circulating system, and where the material of the sheet is relatively non-volatile under the conditions of temperature and gas pressure which are to be employed with this gas circulating system, and wherein the mean absolute effusional resistance coefficient, $\xi$, is greater than $10^{-4}$ and less than 2.0 and whereby when said sheet is positioned within a conduit to form a gas tight seal across the conduit and said conduit is filled with said gas, the gas is urged through said sheet and said conduit.

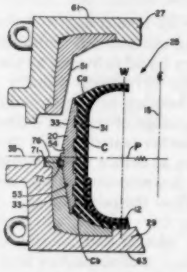
---

**4,147,482**

## CENTERING A TIRE IN A MOLD

**Richard J. Olsen, Massillon; Max D. Brinkley, North Canton, both of Ohio, and John R. Thiele, Topeka, Kans., assignors to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Continuation-in-part of Ser. No. 738,493, Nov. 4, 1976, abandoned. This application Oct. 26, 1977, Ser. No. 845,512**
**Int. Cl.[2] B29H *5/00, 5/08, 17/00***
**U.S. Cl. 425—46** **9 Claims**



**1.** Apparatus for making a large tire comprising means for shaping a carcass for said tire to toroidal shape, curing mold means having two separable mold members disposed oppositely and symmetrically with respect to a mid-circumferential plane of said tire, and a third member disposable between and coaxially of said two mold members, lifting means for transporting said third member from said shaping means to said curing mold means with said carcass held centrally in said third member, said third member comprising removable rigid ring means in endless circular form having a radially inward surface engageable with at least the mid-circumferential centerline region of said carcass to mold and to cure said region and a radially outward surface engageable in coaxial and axially symmetrical register with said plane, said lifting means being operable to dispose said third member around said shaping means, said third member when disposed therearound being cooperable with said shaping means to engage said mid-circumferential centerline region of said carcass being shaped on said shaping means to restrain the diametral expansion of said carcass as shaped on the shaping means to a diameter less than the diameter of the carcass if expanded by said shaping means without said ring.

---

**4,147,483**

## CLIMBING SHUTTERING FOR CASTING CONCRETE STRUCTURES SUCH AS DAMS OR RETAINING WALLS

**Mario Rovera, Rivoli, and Giuseppe Proverbio, Milan, both of Italy, assignors to Technical Services Company-Tesco S.p.A., Milan, Italy**

**Filed Nov. 18, 1977, Ser. No. 852,643**
**Claims priority, application Italy, Feb. 10, 1977, 67298 A/77**
**Int. Cl.[2] E04G *11/28***
**U.S. Cl. 425—65** **8 Claims**

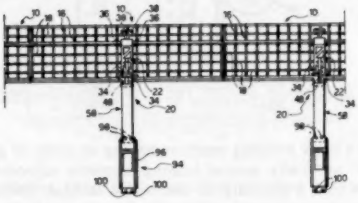
**1.** In a climbing shuttering device of the type comprising:

at least one shuttering panel for defining a vertical or inclined surface of a part of a structure being cast, and

at least one support and elevation device for said at least one panel, said support and elevation device including:

a main frame,

means connecting said main frame to said panel, first fixing means for removably attaching
said main frame and said panel
to said structure being cast,
an upright member longitudinally displaceable with respect to said main frame,
second fixing means for removably attaching said upright member to said structure being cast, at a level below said main frame,
first actuator means interconnecting said main frame and said upright member and operating when actuated to effect relative displacement between said upright member and said main frame, and
separation means for displacing said panel toward or away from said structure being cast,
the improvement wherein:



said first fixing means comprise at least first and second connection elements, said first connection element being located adjacent to the upper edge of said panel and including means for permitting said panel to turn about a horizontal axis adjacent the upper edge thereof parallel to the said surface of said structure;
said second fixing means comprise a skid,
pivot means connecting said skid to the lower end of said upright member, said pivot means defining a horizontal axis parallel to the surface of said structure being cast, and
at least one connection element for the removable connection of said skid to said structure being cast; and
said separation means comprise second actuator means interacting between said skid and said upright member and operable to cause relative angular displacement of said skid and said upright member about said pivotal connection therebetween.

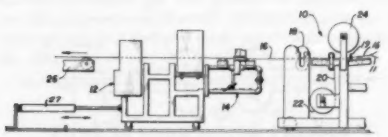
---

**4,147,484**

## PLASTIC SHEET STAMPING APPARATUS

**Clyde Crosby, Gainesville, Ga., assignor to Gladwin, Inc., Oakwood, Ga.**

**Filed Jun. 14, 1977, Ser. No. 806,341**
**Int. Cl.[2] B29D 7/02**
**U.S. Cl. 425—142** **9 Claims**



1. In an apparatus for producing plastic sheets of predetermined size from a thermoplastic material by use of a forming apparatus to initially heat and form the thermoplastic material into a continuous sheet of the desired thickness, conveying the continuous sheet from the forming apparatus and permitting the plastic material to cool and harden, slitting the continuous sheet to the desired width as it moves from the forming apparatus, and cutting the cooled hardened continuous sheet into predetermined lengths by passing it through a cutter which is reciprocably moved along a path parallel to the direction of movement of the sheet, the movement of the sheet and the reciprocal movement of the cutter being coordinated so that the cutter is moving in the same direction and at the same rate as the sheet during the cutting operation,
the improvement comprising a hot die marking apparatus,
means mounting the hot die marker on one side of the continuous sheet between the cutter and the forming apparatus,
means reciprocably moving the hot die marker with the cutter along said path,
the hot die marker including (a) a die for contacting and marking the surface of the continuous sheet,
(b) heater means for heating the die, and
(c) power means for moving the die toward and away from the continuous sheet to move the die into and out of contact with the surface of the sheet, and
control means responsive to operation of the cutter and controlling operation of said power means to move the die into contact with the sheet substantially simultaneously with the cutting of the individual sheets and for moving the die away from the sheet at the conclusion of the cutting operation.

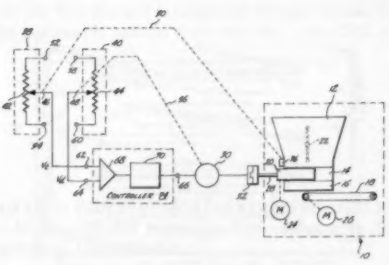
---

**4,147,485**

## APPARATUS FOR AUTOMATIC CONTROL OF FOOD FORMING MACHINES

**Clifton E. Zimmerman, Renton, Wash., assignor to Automators, Inc., Renton, Wash.**

**Filed Dec. 1, 1976, Ser. No. 746,403**
**Int. Cl.[2] A23P 1/00; A22C 7/00**
**U.S. Cl. 425—144** **3 Claims**



1. In a food forming machine for molding a food product from a moldable food substance wherein said food forming machine includes a compression chamber for receiving said moldable food substance, a molding station having mold cavities for receiving food substance from said compression chamber for forming a molded food product of predetermined size and shape, ram means operable to compress said moldable food substance within said compression chamber and establish a forming pressure that causes a portion of said food substance within said compression chamber to enter said mold cavities of said molding station and form said molded food product, and a rotatable rod operatively connected to said ram means for establishing the stroke length of said ram means to control said forming pressure established by said ram means, an improvement for automatically rotating said rotatable rod to cause said food forming machine to produce molded food products of a substantially constant weight and density, said improvement comprising:
temperature sensing means mounted in thermal communication with said food substance supplied to said compression chamber, said temperature sensing means for supplying a signal representative of the temperature of said food substance;
rotary actuator means having an output shaft operatively coupled to said rotatable rod, said rotary actuator means being responsive to a control signal for selectively activat-

ing said rotatable rod to increase and decrease said forming pressure;

signal supply means operatively interconnected with said rotary actuator means and responsive to a control action effected by said rotary actuator means, said signal supply means including a variable resistance device for supplying a signal representative of the position of said output shaft of said rotary actuator means; and

controller means connected for receiving said signal supplied by said temperature sensing means and said signal supplied by said variable resistance device of said signal supply means, said controller means including means for supplying said control signal to said rotary actuator means to activate said rotary actuator for rotation of said rotatable rod in a first direction that decreases said forming pressure when said signal supplied by said temperature sensing means exceeds said signal supplied by said variable resistance device and to activate said rotary actuator for rotation of said rotatable rod in a second direction that increases said forming pressure when said signal supplied by said variable resistance device exceeds said signal supplied by said temperature sensing means.

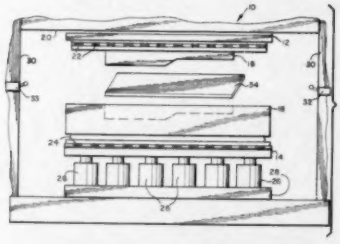
---

**4,147,486**

## MECHANICAL PRESS FOR MOLDING PLASTIC PARTS

**Herbert A. Jahnle, Havertown, Pa., assignor to The Budd Company, Troy, Mich.**

**Filed May 8, 1978, Ser. No. 903,749**
**Int. Cl.[2] B30B *1/32, 11/04, 15/16;* B29C *17/00***
**U.S. Cl. 425—157** **6 Claims**



1. In a press,

upper and lower platens having molds thereon disposed to be reciprocally moved with respect to each other to mold plastic material disposed therebetween,

mechanical means including a first sequencer for lowering said upper platen and maintaining it at a lowered position during molding of said plastic material and returning it to its upper position after said molding operation,

a source of liquid fluid,

a first accumulator containing an inert gas for receiving said liquid fluid to provide relatively low fluid pressure,

a second accumulator containing an inert gas for receiving said liquid fluid for providing relatively high pressure,

means connecting said liquid fluid source to said first and second accumulators,

a plurality of hydraulic cylinders for supporting said lower platen and connected to receive pressurized fluid from said first and second accumulators,

a second sequencer for sequentially controlling the application of pressures and time durations thereof to said plurality of cylinders from said first and second accumulators during the molding of said plastic material, and

an adjustable valve connected between said second accumulator and said cylinders to control the rise time of the pressure applied to said cylinders.

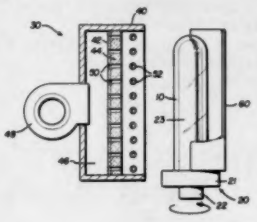
---

**4,147,487**

## HEATING SYSTEM FOR THE MANUFACTURE OF PLASTICS ARTICLES

**Andrew C. Dickson, Toledo, Ohio, and Richard A. Morrette, Temperance, Mich., assignors to Owens-Illinois, Inc., Toledo, Ohio**

**Division of Ser. No. 677,600, Apr. 16, 1976, Pat. No. 4,079,104.**
**This application Jun. 27, 1977, Ser. No. 810,139**
**Int. Cl.[2] B29C *17/07***
**U.S. Cl. 425—174.4** **5 Claims**



1. In a blow molding machine having an array of generally parallel, vertically spaced heating elements adjacent a path along which a plurality of essentially tubular thermoplastic parisons are conveyed in succession in route to a blow molding station where each parison is blown within a blow mold to form a blown plastic article, a gaseous coolant source for directing coolant gas onto the outer peripheral surface of the parisons as they are conveyed in heat exchange proximity to the heating elements, and means for rotating the parisons while in heat exchange proximity to the heating elements, the improvement of said heating elements consisting of infra-red sources generating a spectral energy peak wave length of about 1.2 microns to completely penetrate the thickness of the plastic parison in order to substantially uniformly heat the parison across its wall thickness at each radial position to within a temperature gradient of no more than about 5° C. to about 10° C., and the heating elements being interposed between said path and the gaseous coolant source.

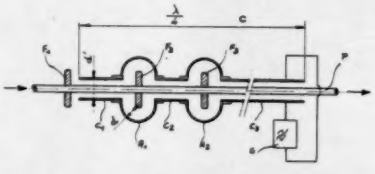
---

**4,147,488**

## HIGH FREQUENCY APPARATUS FOR FORMING STRUCTURAL SHAPES

**Georges Chiron, Chambery, France, assignor to Saint-Gobain Industries, Neuilly-sur-Seine, France**

**Filed Apr. 20, 1977, Ser. No. 789,221**
**Claims priority, application France, Apr. 21, 1976, 76 11687**
**Int. Cl.[2] B29C *25/00***
**U.S. Cl. 425—174.8 E** **15 Claims**



1. Apparatus for producing continuous shaped structures from resin impregnated material comprising a dielectric heater having opposed electrodes extending between an entrance and outlet of the heater, a preforming means located upstream of the heater for preforming the impregnated material, forming means comprising a succession of short dies located within the dielectric heater, drive means for moving the resin impregnated material through the preforming means, the dielectric heater, and the forming means, generating means operatively

associated with said electrodes for generating a high frequency current, and means for supplying the high frequency current from the generating means to the electrodes of the dielectric heater in a manner so that the maximum value of the resulting electrical field is located adjacent the entrance of the dielectric heater.

---

**4,147,489**

## POWDER COMPACTING PRESSES

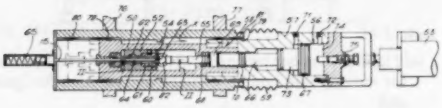
**George Milburn, and John Chetter, both of Lytham St. Annes, England, assignors to British Nuclear Fuels Ltd., Warrington, England**

**Filed Aug. 9, 1977, Ser. No. 823,194**

**Claims priority, application United Kingdom, Jun. 22, 1977, 26164/77**

**Int. Cl.[2] B30B *11/04***

**U.S. Cl. 425—355** **4 Claims**



1. A pelleting press for compacting powders into a shape comprising

a stationary cylindrical die,

a support frame movable relative to the stationary die,

a first plunger rigidly mounted on the support frame and located on the same axis as the cylindrical die so as to be movable into and through the die as the support frame moves relative to the die,

a second plunger mounted on the support frame on the same axis as the first plunger and movable relative to said support frame so as to advance towards and retract away from the first plunger,

means for feeding a powder to be compacted to one end of the die,

means for moving the support frame to advance the first plunger into the die so that the powder to be compacted is metered and charged into the die from said one end of the die by the first plunger,

means for advancing the second plunger towards the first plunger within the die to compact the powder therebetween, said second plunger moving relative to the support frame whilst the support frame is stationary relative to the die,

the means for moving the support frame also being able to cause further advancement of the first plunger relative to the die so that the first plunger passes through the die, the second plunger being stationary relative to the support frame during said further advancement, and said further advancement occurring after the second plunger has been advanced towards the first plunger to compact the powder therebetween so that the compacted powder is held between the first and second plungers and is ejected from the other end of said die by the first plunger.

---

**4,147,490**

## POWDER COMPACTING PRESSES

**Roy Stewart, Blackpool, England, assignor to British Nuclear Fuels Ltd., Warrington, England**

**Filed Aug. 9, 1977, Ser. No. 823,195**

**Claims priority, application United Kingdom, Aug. 13, 1976, 33874/76**

**Int. Cl.[2] B30B *11/04***

**U.S. Cl. 425—355** **7 Claims**

1. A press for compacting powder in a die comprising

a stationary die,

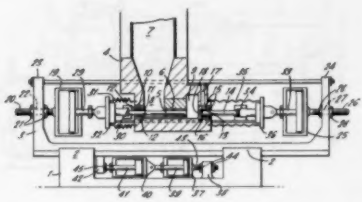
a support member movable relative to the stationary die,

a first plunger mounted on the support member on the same axis as the die and capable of being moved into and through the die as the support member is moved relative to the die and also being movable along said axis relative to the support member,

a second plunger mounted on the support member on the same axis as the first plunger and capable of being moved along said axis relative to the support member,

means for feeding powder to be compacted to one end of the die,

means for moving the support member with the first plunger



stationary relative to the support member so that the first plunger advances into the die to meter and charge the powder to be compacted into the die from said one end of the die,

means for advancing the first and second plungers relative to the support member to compact the powder within the die,

and means for further moving the support member with the first plunger stationary relative to the support member so that the first plunger is advanced through the die to eject the compacted powder from the other end of the die.

---

**4,147,491**

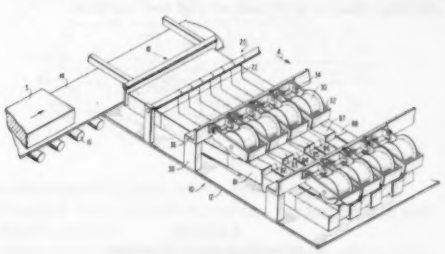
## APPARATUS FOR FORMING SIMULATED OLD BRICK

**James M. Postell, Jr., Columbia, S.C., assignor to Richtex Corporation, Columbia, S.C.**

**Filed Jan. 27, 1978, Ser. No. 873,071**

**Int. Cl.[2] B28B *11/08***

**U.S. Cl. 425—385** **23 Claims**



1. Apparatus for forming simulated old brick comprising:

a support for a plurality of bricks arranged in a row;

means for changing the relative elevation of adjacent bricks in said row to locate lengthwise extending faces of alternate bricks in said row at elevations different than the elevations of the corresponding lengthwise extending faces of bricks adjacent the alternate bricks in said row; and

means for forming impressions in the lengthwise extending faces and edges of said alternate bricks.

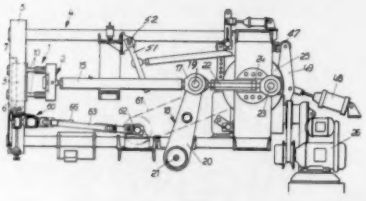
## 4,147,492
## MACHINE PRESS, SPECIFICALLY A STAMPING PRESS

Alfons W. Thiel, Mainz, and Hans Hell, Wiesbaden-Freudenberg, both of Fed. Rep. of Germany, assignors to Bellapast GmbH, Wiesbaden-Biebrich, Fed. Rep. of Germany

Continuation of Ser. No. 772,091, Feb. 27, 1977, abandoned, which is a continuation-in-part of Ser. No. 602,126, Aug. 5, 1975, abandoned. This application Feb. 24, 1978, Ser. No. 881,061

Int. Cl.[2] B29C *17/00;* B30B *15/06*

U.S. Cl. 425—394 12 Claims



1. In a stamping press having a stationary frame having a planar tool locating surface, a stamping tool mounted on said frame, said tool comprising a fixed tool section secured upon said planar locating surface, guiding means mounted on said fixed tool section, a movable tool section slidably supported on said guiding means for reciprocation relative to said fixed tool section and substantially at right angles to the plane of said locating surface, and means mounted on said frame operatively connected to said movable tool section for cyclically moving said movable tool section toward and away from said fixed tool section to effect stamping operations on material disposed between said tool sections, said means for moving said movable tool section comprising a rocker arm assembly pivoted on said frame for swinging about a fixed axis substantially parallel with respect to said locating surface, drive means connected for cyclically rocking said rocker arm assembly upon said axis, and a pair of substantially parallel reciprocable push rods each pivotally connected at one end to laterally spaced parts of said movable tool section and at the other end to said rocker arm assembly, said drive means thereby cyclically reciprocating said push rods and correspondingly moving said movable tool section, said rocker arm assembly having a transverse rod parallel to said axis, and said push rods being pivotally linked to said transverse rod at said other ends, and means for independently adjusting the length of each one of said push rods for effecting relative alignment of said tool sections.

---

## 4,147,493
## IGNITER FOR FLARES

John F. Straitz, III, Elkins Park, Pa., assignor to Combustion Unlimited Incorporated, Jenkintown, Pa.

Filed Nov. 3, 1977, Ser. No. 848,075

Int. Cl.[2] F23D *13/20*

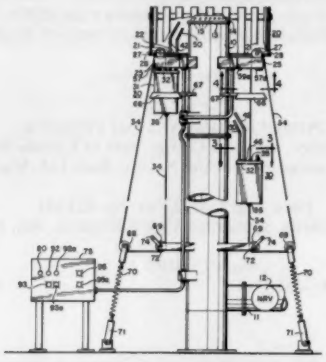
U.S. Cl. 431—15 14 Claims

1. An igniter for a flare stack comprising

an igniter member having ignition electrodes extending therefrom,

mounting means carried by the stack for selectively moving said igniter member to a position for igniting combustible gases discharging from the flare stack,

said mounting means including a bracket carried on said stack,



said igniter member having a cable member attached thereto for moving said igniter member to a position for ignition, and

means for activating said electrodes.

---

## 4,147,494
## GAS BURNER IGNITION DEVICE

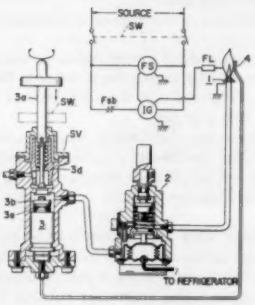
Tsuneo Ando, and Hironori Nakajima, both of Konan, Japan, assignors to Howa Sangyo Kabushiki Kaisha, Aichi, Japan

Filed Oct. 19, 1976, Ser. No. 733,741

Claims priority, application Japan, Apr. 14, 1976, 51-42974; Apr. 14, 1976, 51-42975

Int. Cl.[2] F23H *5/08*

U.S. Cl. 431—71 2 Claims




1. A gas burner ignition device for a gas-operated refrigerator, which comprises:

(a) a safety valve provided in a gas line connected to a gas burner, for controlling a flow of gas supplied to said gas burner, said safety valve including a valve body having a first position in which it permits flow of gas to the gas burner and a second position in which it prevents such flow, and means biasing the valve body towards said second position;

(b) an electrode disposed adjacent the gas burner;

(c) ignition control means for controlling ignition of said gas burner, said ignition control means having high voltage generating means connected to said electrode and energizable to apply a high voltage to said electrode to ignite gas supplied to said gas burner, and flame detecting means connected to said electrode for detecting whether gas supplied to said gas burner is burning, said flame detecting means being connected to control said high voltage generating means so that when the gas is burning the high

voltage generating means is de-energized whereas when the gas is extinguished the high voltage generating means is energized to re-ignite the gas;

(d) a thermocouple positioned adjacent the gas burner so as to be heated when gas supplied to the gas burner is burning, thereby to generate a thermal electromotive force; and

(e) valve actuating means connected to the thermocouple and operable by the thermal electromotive force generated thereby when gas supplied to the gas burner is burning to overcome the biasing means and hold said valve body in its first position, the valve body being released and returning to the second position when the gas is extinguished.

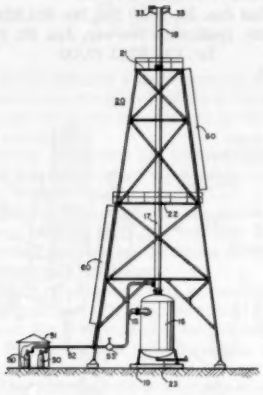
---

**4,147,495**

## WASTE GAS DISPERSION STACK

**John F. Straitz, III, Elkins Park, Pa.**

**Filed Oct. 26, 1977, Ser. No. 845,562**
**Int. Cl.[2] F23D** *13/20*
**U.S. Cl. 431—23** **14 Claims**



1. A vent stack for waste gases comprising

an upright tubular member to which waste gas is delivered for discharge,

a discharge head at the terminal end of said tubular member and having discharge members for discharging waste gas in a plurality of separated streams in aspirating relation to the atmosphere for dilution of the discharging waste gas, and

means connected to a source of fire suppression material from the group consisting of carbon dioxide gas, dry fire suppression chemical with nitrogen propellant and halon, for delivering said material into the waste gas upstream of said discharge members.

---

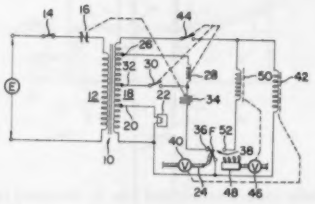
**4,147,496**

## SAFETY IGNITION MEANS FOR BURNER INSTALLATIONS

**Satoshi Oikawa, Kawasaki, Japan, assignor to Robertshaw Controls Company, Richmond, Va.**

**Filed Sep. 28, 1977, Ser. No. 837,600**
**Claims priority, application Japan, May 2, 1977, 52-56553[U]**
**Int. Cl.[2] F23Q** *9/14*
**U.S. Cl. 431—43** **6 Claims**

1. Safety ignition means for burner installations comprising a transformer having a primary winding adapted to be connected to a power source; a normally closed delay operating switch connected between the power source and said transformer; means connected to a secondary winding of said transformer for igniting pilot burner means; relay means connected to said secondary winding of said transformer through timer means and flame switch means, said relay means having a normally opened relay switch connected between a tap of said secondary winding and said relay means for self-hold of said relay; said timer means being associated with said delay operating switch and being operative, when said timer means is continuously energized above a predetermined period of time, to open said delay operating switch; first solenoid operated valve means for the pilot burner means and having a solenoid connected across said secondary winding of said transformer through a second normally opened relay switch of said relay



means; and second solenoid operated valve means for main burner means and having a solenoid connected parallel with said solenoid of said first valve means through said flame switch means; said flame switch means being operative in response to the pilot burner flame to deenergize said timer means and energize said solenoid of said second solenoid operated valve, whereby, when no burner flame is established within said predetermined period of time, said delay operating switch is opened by said timer means so as to separate the ignition means from the power source.

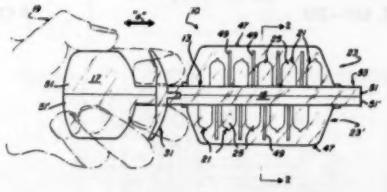
---

**4,147,497**

## HAND-OPERABLE SIGNAL DEVICE USING PERCUSSIVELY-IGNITABLE FLASHLAMPS

**Thomas Haraden, Ipswich, Mass., assignor to GTE Sylvania Incorporated, Danvers, Mass.**

**Filed Jan. 4, 1977, Ser. No. 756,928**
**Int. Cl.[2] F21K** *5/02*
**U.S. Cl. 431—359** **9 Claims**



1. A hand-operable signal device comprising:

an elongated body member including a support portion and a handle portion;

a plurality of percussively-ignitable flashlamps mounted on said support portion;

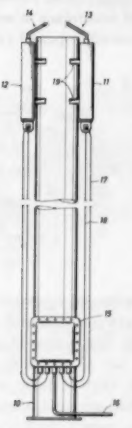
a trigger member movably oriented on said elongated body member substantially between said support and handle portions and adapted for reciprocal movement therebetween; and

a firing mechanism located within said support portion relative to each of said percussively-ignitable flashlamps, said firing mechanism operatively joined to said trigger member for selectively firing each of said flashlamps in response to said reciprocal movement of said trigger member between said support and handle portions.

## 4,147,498
## IGNITION ASSEMBLY FOR FLARE STACKS

Robert R. Clarke, Houston, Tex., assignor to Clarke, Inc., Houston, Tex.

Filed Jan. 13, 1977, Ser. No. 759,014
Int. Cl.[2] F23D 13/20
U.S. Cl. 431—202 20 Claims



1. Apparatus for igniting waste gases flowing from an exhaust exit, of a flare gas stack comprising:

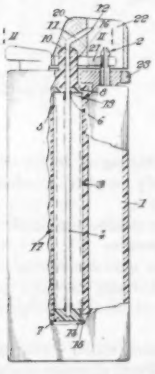
an ignition assembly for said gases including at least one pair of spaced apart ignitor rods located adjacent said exhaust exit, and

means for selectively energizing said at least one pair of ignitor rods with a voltage sufficient to produce a spark for ignition of said flowing gas.

## 4,147,499
## VOLTAGE BOOSTING TRANSFORMER AND AN ELECTRONIC IGNITION GAS LIGHTER USING SUCH A TRANSFORMER

Henri E. F. M. Courier de Méré, Paris, France, assignor to BICOSA Societe de Recherches, France

Filed Aug. 8, 1977, Ser. No. 823,019
Claims priority, application France, Aug. 23, 1976, 76 25504
Int. Cl.[2] F23Q 7/12
U.S. Cl. 431—255 9 Claims

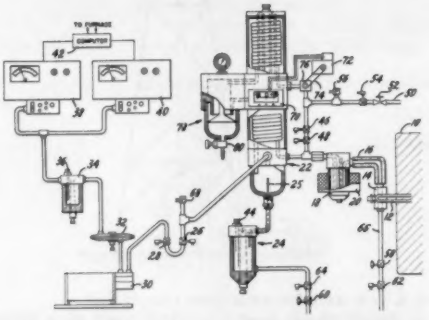


1. A lighter comprising: a fuel gas reservoir; a gas release nozzle for the release of the fuel gas; means for lighting the fuel gas comprising two spaced electrodes defining therebetween a spark-gap; and means for supplying an electric potential across the spark-gap comprising an output transformer having a magnetic circuit, a primary winding and a secondary winding, said secondary winding being intended to supply an electric potential to said electrodes of the spark-gap, said magnetic circuit of said transformer comprising at least one electrically conducting part which forms an integral one-piece structure with one of said electrodes, said secondary winding having an output terminal in electrical connection with said one conducting part, an elongated conducting element having said primary and secondary windings of said transformer wound around a first part of said conducting element and a second part of said conducting element comprising said one conducting part which carries said one electrode of the spark-gap, and wherein the other electrode of said spark-gap comprises said gas release nozzle, said nozzle and a terminal of the secondary winding of said transformer being, in operation, brought to the same potential.

## 4,147,500
## SYSTEM FOR CONTINUOUS ANALYSIS OF GASSES

Harald Karlsoen, Siggerud, Norway, assignor to Elkem-Spigerverket A/S, Oslo, Norway

Filed Jun. 30, 1977, Ser. No. 811,826
Claims priority, application Norway, Jun. 30, 1976, 762263
Int. Cl.[2] F23J 15/00
U.S. Cl. 432—2 21 Claims



10. An apparatus for cleaning of gas from a furnace prior to the gas passing through at least one measuring instrument for analysis thereof, said apparatus including filter means for removing particulate matter and cooling means for removing moisture, said cooling means cooling the furnace gas to a temperature approaching the freezing point of water whereby moisture in the furnace gas is condensed and removed from the furnace gas, a pump situated after said cooling means for pumping said gas to the measuring instruments, and a water separator situated after said pump, said water separator including a fluid level sensor which, when the fluid level reaches it, automatically generates a signal which closes valve means to stop the flow of gas to said measuring instruments to prevent damage thereto.

12. A method of cleaning gas from a furnace before it is supplied to at least one measuring instrument for analysis thereof, said method including:

(1) filtering said furnace gas to remove particulate matter;

(2) cooling said furnace gas to near the freezing point of water to thereby condense any moisture in the furnace gas and thus remove it from the furnace gas as a liquid;

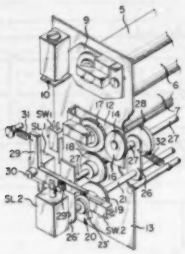
(3) continuously collecting the water condensed during the cooling step; and

(4) sensing when a predetermined amount of water has been collected and, when said predetermined amount of water has been collected, feeding pressurized gas through the filter to thereby reverse flush it.

## 4,147,501
## FIXING DEVICE

Yoshitomo Goshima, Yokohama; Shigeyoshi Onoda, Kawasaki; Kazuo Kawakubo, Hino; Osamu Hoshino, Tokyo; Haruo Tsunoi, Kawasaki, and Noriyoshi Iida, Ichikawa, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 742,355, Nov. 16, 1976, abandoned.
This application Mar. 6, 1978, Ser. No. 883,708
Claims priority, application Japan, Nov. 22, 1975, 50/140956
Int. Cl.[2] H05B 3/10; G03G 15/20
U.S. Cl. 432—60 20 Claims



1. A fixing device wherein a sheet carrying a toner image is passed between the nip of a pair of rollers, at least one of which is heated, thereby fixing the toner image on the member, the improvement comprising:

means mounting the rollers for relative radial movement between a pressure-contact relationship and a non-pressure-contact relationship;

a first gear mounted for rotational movement;

a second gear meshing with said first gear and revolvable about said first gear, so that the center of said second gear moves around said first gear;

means providing relative revolving movement between said first and second gears, in response to said rotation of said second gear, for revolving said second gear around said first gear from a first to a second position; and

pressure applying means coupled to said second gear and operatively associated with at least one of said rollers for moving said rollers into said pressure-contact relationship in response to revolving movement of said second gear to said first position, and into said non-pressure-contact relationship in response to revolving movement of said second gear to said second position.

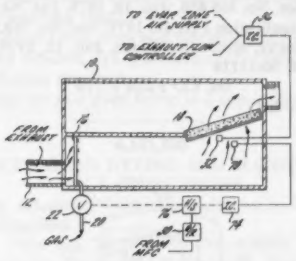
---

## 4,147,502
## SYSTEM FOR CONTROL OF THERMAL POTENTIAL

Clare L. Milton, Jr., Baltimore, Md., assignor to Roper Corporation, Kankakee, Ill.

Continuation-in-part of Ser. No. 613,641, Sep. 15, 1975, Pat. No. 4,094,627, which is a continuation of Ser. No. 521,525, Nov. 6, 1974, abandoned, which is a continuation-in-part of Ser. No. 464,185, Apr. 25, 1974, abandoned. This application Aug. 11, 1977, Ser. No. 823,636
Int. Cl.[2] F23J 5/00
U.S. Cl. 432—72 13 Claims

1. In an oven system for treating material containing a combustible solvent based coating including at least one oven, means for introducing fresh air therein and means for exhausting an airstream containing combustible vapors therefrom; a system for controlling the thermal potential of the exhaust airstream comprising, in combination, a sensing chamber into which at least a portion of said exhaust airstream is directed, a burner in said chamber for initiating oxidation of said vapors such that the temperature of the air in said chamber downstream from said burner is the sum of (a) the temperature rise due to the heat added to the airstream by combustion of auxiliary fuel supplied to the burner and (b) the thermal potential of the airstream, means for defining, over variations in airstream temperature and/or volumetric flow rate, the temperature rise (a) due to combustion of auxiliary fuel so that a rise in the temperature of the airstream within said chamber which is due to a change in the thermal potential of the exhaust airstream introduced into said chamber is distinguishable, means responsive to the distinguished temperature rise for signaling a rise in



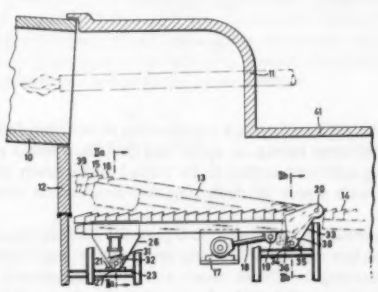
the thermal potential of said exhaust airstream when a predetermined safe value is exceeded, and means responsive to said signaling means for lowering the thermal potential of said airstream by increasing the flow rate of fresh air introduced into said oven.

---

## 4,147,503
## GRID COOLER, PARTICULARLY FEED STEP GRID COOLER

Horst Herchenbach, Troisdorf, and Richard Schneider, Bonn-Bad Godesberg, both of Fed. Rep. of Germany, assignors to Klöckner-Humboldt-Deutz AG, Fed. Rep. of Germany

Filed Sep. 27, 1977, Ser. No. 837,296
Claims priority, application Fed. Rep. of Germany, Oct. 9, 1976, 2645670
Int. Cl.[2] F27D 15/02
U.S. Cl. 432—78 15 Claims



1. A grid cooler for cooling hot material such as cement clinker issuing from a rotary kiln comprising in combination:

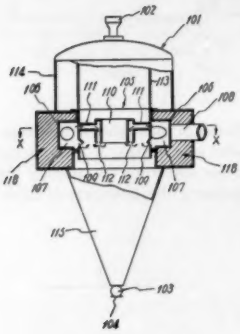
a generally horizontal movable cooling grid having an upper support surface and having openings for the upward passage of air through material flowing across the grid on said support surface from a receiving end to a discharge end and being inclined downwardly from the receiving to the discharge end;

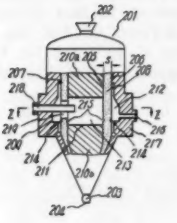
and means for changing the angle of inclination from the receiving to the discharge end so that variations in material and temperatures may be compensated for in increasing or decreasing movement of material on the grid.

## 4,147,504
## APPARATUS FOR REGENERATING ACTIVATED CARBON

Kiyoshi Akae, Kyoto; Masaya Kitada, Nishinomiya, and Yoshiyuki Uno, Ibaraki, all of Japan, assignors to Unitika Limited, Amagasaki, Japan

Division of Ser. No. 585,458, Jun. 10, 1975, Pat. No. 4,030,876.
This application Feb. 16, 1977, Ser. No. 768,969
Claims priority, application Japan, Jun. 12, 1974, 49-67410; Jan. 23, 1975, 50-11118
Int. Cl.[2] F27B *15/10*
U.S. Cl. 432—101 8 Claims





1. An activated carbon regenerating or reviving furnace of the shaft type having an upper end provided with a port for feeding activated carbon to be treated and a lower end provided with a port for delivering activated carbon after treatment;

columnar means between said ports for defining an activated carbon moving bed having successive drying, burning and reviving treatment zones extending downwardly from said upper end, said columnar means including at least one sleeve having an imperforate cylindrical wall extending upwardly from said delivery port means;

header means provided around said columnar means in said reviving treatment zone for defining a high temperature inert gas channel;

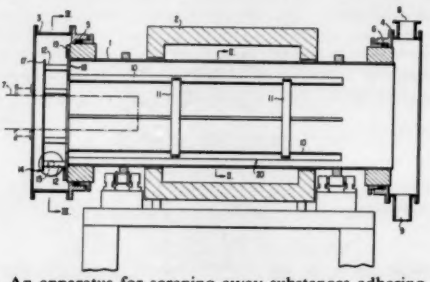
burner means for tangentially directing combustion exhaust gases to said header means for circulation therein; and

high temperature inert gas delivery port means communicating between said header means and said carbon bed for uniformly distributing said high temperature inert gas to said carbon bed for upward movement therein, said gas delivery port means comprising a plurality of ports located substantially in a common horizontal plane.

## 4,147,505
## APPARATUS FOR SCRAPING AWAY SUBSTANCES ADHERING TO INNER WALL OF ROTARY KILN

Sigezo Kawakami; Kunihiko Tsuji, both of Kobe; Hiroshi Omura, Kakogawa, and Hisai Ishizuka, Kobe, all of Japan, assignors to Kobe Steel, Ltd., Kobe, Japan

Filed Apr. 8, 1977, Ser. No. 785,961
Claims priority, application Japan, Apr. 9, 1976, 51-40667
Int. Cl.[2] F27B *7/14*
U.S. Cl. 432—118 7 Claims

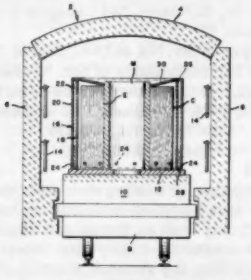


1. An apparatus for scraping away substances adhering to the inner wall of a rotary kiln, which comprises (A) a cylindrical cage having openings enabling a material to be treated to pass therethrough in both the axial direction and radial direction, said cage including (1) a supporting frame and (2) a plurality of plate members extending in the axial direction of a kiln proper and being arranged at prescribed intervals on the outer periphery of said supporting frame, said cage having a diameter smaller than the inner diameter of the kiln proper, (B) means for mounting the cage in the kiln proper such that at least one of said plate members is contacted with the inner face of the kiln proper so that the cage is freely rotated with rotation of the kiln proper, said means further mounting said cage such that the kiln may rotate relative to the cage, and (C) stop means engaged with a part of said cage to intermittently stop the rotation of the cage.

## 4,147,506
## METHOD AND APPARATUS FOR HEATING COILS OF STRIP

Raymond L. Southern, Lower Burrell; James G. Benford, Pittsburgh; Steve Petarra, Harwick; Robert D. Holbein, Sarver, and Albert F. Vince, Leechburg, all of Pa., assignors to Allegheny Ludlum Industries, Inc., Pittsburgh, Pa.

Filed Oct. 14, 1977, Ser. No. 842,183
Int. Cl.[2] F27B *9/00, 11/00*
U.S. Cl. 432—148 12 Claims



10. An inner cover for annealing coils of strip comprising an insulated cylindrical side wall including a first metal cylinder, a second metal cylinder surrounding said first metal cylinder coaxial therewith, said second cylinder being spaced from said first cylinder to provide a space therebetween and a single metal plate attached to the top of said cylinders and forming a closed roof means for sealing the ends of the space between said cylinders, and vent holes at the lower end of the outer cylinder.

## 4,147,507
## PRODUCTION OF COLORED PATTERNS ON NAP FABRICS

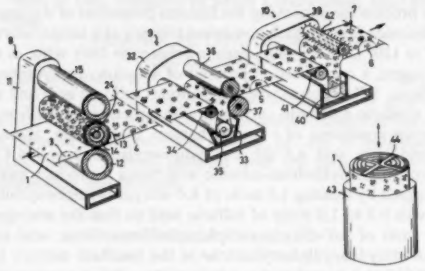
**Heinrich Laus, Grefrath-Oedt, Fed. Rep. of Germany, assignor to Girmes-Werke AG, Grefrath-Oedt, Fed. Rep. of Germany**

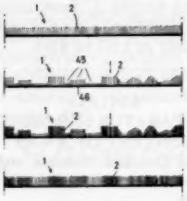
**Continuation of Ser. No. 625,898, Oct. 28, 1975, abandoned. This application Oct. 20, 1977, Ser. No. 843,808**

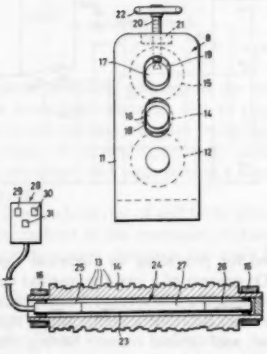
**Claims priority, application Fed. Rep. of Germany, Oct. 31, 1974, 2451806**

**Int. Cl.[2] D06P *7/00***

**U.S. Cl. 8—1 XB** **2 Claims**







1. A method for producing a pattern of color intensity variation upon the nap of a nap fabric comprising the steps of:

(a) selecting in a first selecting step, a nap fabric in which the nap is comprised of acrylic material; and

(b) selecting in a second selecting step, a desired pattern of color intensity variation for said fabric; the improvement characterized by

(c) reducing the dye absorption capacity of portions of said nap by applying pressure within the range of between about 1 and 5 kilograms per square centimeter and heat at a temperature within the range of between about 170° C. and 190° C. to portions thereof according to said second selecting step;

(d) said reducing step being carried out by passing said fabric over a heated metal cylinder engraved according to said second selecting step;

(e) passing said fabric from said first selecting step through a dye bath wherein dye is absorbed according to said second selecting step; and

(f) finishing the said dyed fabric in a conventional manner.

---

## 4,147,508
## SIMULTANEOUS DYEING AND BONDING OF POLYAMIDE FIBERS

**Max Perrig, Arlesheim, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland**

**Filed Sep. 26, 1977, Ser. No. 836,555**

**Claims priority, application Switzerland, Sep. 29, 1976, 12301/76**

**Int. Cl.[2] D06P *5/00***

**U.S. Cl. 8—17** **11 Claims**

1. In a process wherein a band of untwisted polyamide fibers is impregnated with an aqueous liquor containing a dyestuff suitable for dyeing said fibers, the impregnated band is subjected to pressure to compact said band and remove excess liquor and the compacted band is subjected to an elevated temperature of 80° to 250° C. sufficient to cause simultaneous fixation of the dye and bonding of the fibers, the improvement which comprises having present in the aqueous liquor a compound selected from the group consisting of malic, tartaric and citric acids.

---

## 4,147,509
## PRESSURE-SENSITIVE RECORDING MATERIAL

**Hans Baumann, Wachenheim, and Andreas Oberlinner, Ludwigshafen, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Rheinland-Pfalz, Fed. Rep. of Germany**

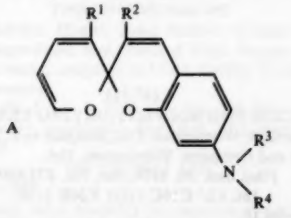
**Filed Jan. 9, 1978, Ser. No. 868,211**

**Claims priority, application Fed. Rep. of Germany, Jan. 29, 1977, 2703811**

**Int. Cl.[2] D06P *5/00*; B41L *1/16***

**U.S. Cl. 8—18 R** **11 Claims**

1. A pressure-sensitive recording material comprising a substrate coated with a dye-forming component and a binder which permits release of the dye-forming component upon the application of pressure to the substrate, wherein the dye-forming component is a spirodipyran of the formula



where A is the radical of a fused benzene ring which is unsubstituted or substituted by alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, nitro, chlorine, bromine or carboalkoxy (where alkoxy is of 1 to 6 carbon atoms) or is the radical of a naphthalene ring which is fused in the 2,1-position and is unsubstituted or substituted by chlorine, bromine or carboalkoxy (where alkoxy is of 1 to 6 carbon atoms), $R^1$ is alkyl of 1 to 16 carbon atoms, phenyl, which is unsubstituted or substituted by alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, chlorine or bromine, or phenylalkyl of 7 to 10 carbon atoms, $R^2$ is hydrogen or $R^1$ and $R^2$ together are a trimethylene or tetramethylene bridge, which is unsubstituted or in which one,

two or three H atoms are substituted by alkyl of 1 to 12 carbon atoms, $R^3$ is benzyl or $\beta$-phenylethyl and $R^4$ is benzyl, $\beta$-phenylethyl or phenyl which is unsubstituted or substituted by chlorine, bromine, alkyl of 1 to 4 carbon atoms, methoxy or ethoxy, $R^3$ and $R^4$ being identical or different, or $R^3$ is alkyl of 1 to 4 carbon atoms and $R^4$ is phenyl which is unsubstituted or substituted by chlorine, bromine, alkyl of 1 to 4 carbon atoms, methoxy or ethoxy, or $R^3$ is benzyl and $R^4$ is $\beta$-cyanoethyl.

---

## 4,147,510
## COLORATION PROCESS

**Stephen B. Bostock; Andrew H. M. Renfrew, and Geoffrey H. Cartwright, all of Manchester, England, assignors to Imperial Chemical Industries Limited, London, England**

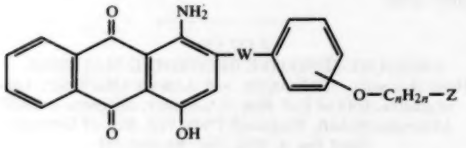
**Filed Aug. 31, 1977, Ser. No. 829,503**

**Claims priority, application United Kingdom, Sep. 15, 1976, 38192/76**

**Int. Cl.**[2] **C09B** *1/00, 5/62*

**U.S. Cl. 8—39 C** **5 Claims**

1. A process for the colouration of aromatic polyester or cellulose-triacetate textile materials which comprises applying to the said textile materials by an aqueous dyeing, padding or printing process a disperse anthraquinone dyestuff, free from carboxylic acid and sulphonic acid groups, which is of the formula:




wherein W is an oxygen or a sulphur atom, n is a positive integer of from 1 to 7, and Z is a —CN, —CONHR or —COOR group, wherein R is an optionally substituted hydrocarbon radical, and subsequently giving the coloured textile material a treatment in an aqueous alkaline bath at a pH above 8 and at a temperature between 50° and 85° C.

---

## 4,147,511
## PROCESS FOR SOLVENT-DRYING LEATHER

**Philip L. Bartlett, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Jan. 30, 1978, Ser. No. 873,660**

**Int. Cl.**[2] **C14C** *1/00;* **F26B** *3/00*

**U.S. Cl. 8—94.18** **20 Claims**

1. A process for drying water-wet animal hides which comprises contacting the water-wet hides with a single phase drying medium comprising a chlorine-containing carrier liquid and methanol and removing the hides from contact with the drying medium when the required amount of water has been removed, said carrier liquid being selected from a member of the group:
1,1,2-trichlorotrifluoroethane,
trichlorofluoromethane,
tetrachloroethylene,
1,1,1-trichloroethane, and
mixtures thereof.

## 4,147,512
## FIXING AGENT FOR IMPROVING FASTNESS PROPERTIES OF DYEINGS ON POLYAMIDE FIBERS AND PREPARATION THEREOF

**Akio Kobayashi, Toyonaka; Yoshiyuki Shimohiro, Sakai; Kisaburou Shimizu, Osaka, and Yoshiaki Murakami, Kobe, all of Japan, assignors to Dainippon Pharmaceutical Co., Ltd., Osaka, Japan**

**Division of Ser. No. 551,994, Feb. 21, 1975. This application Mar. 2, 1977, Ser. No. 773,509**

**Int. Cl.**[2] **D06P** *5/04, 5/08, 1/62*

**U.S. Cl. 8—165** **8 Claims**

1. A process for improving the fastness properties of dyeings on polyamide fibers which comprises treating at a temperature of 95° to 120° C. in a dyeing bath, a polyamide fiber with, as a fixing agent, a condensation product of 4,4'-di-hydroxydiphenylsulfone, 4,4'-dihydroxydiphenylsufone- sulfonic acid and a lower aliphatic aldehyde, or its salt with a metal selected from the group consisting of calcium, barium, magnesium, aluminum and iron; said 4,4'-dihydroxydiphenylsulfone and 4,4'-dihydroxydiphenylsulfone-sulfonic acid being a product mixture formed by treating 1.0 mole of 4,4'-dihydroxydiphenylsulfone with 0.8 to 1.0 mole of sulfuric acid so that the average molar ratio of 4,4'-dihydroxydiphenylsulfonesulfonic acid to free 4,4'-dihydroxydiphenylsulfone in the resultant mixture is from 0.015 to 1.1; and said product mixture being condensed with 1.0 to 1.2 moles of said lower aliphatic aldehyde; the condensation product having a mean molecular weight of about 5,000 to about 30,000 and a ratio of carbon atom content and sulfur atom content of 3.0:1 to 4.0:1.

---

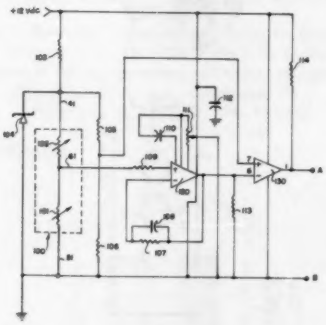
## 4,147,513
## METHOD AND APPARATUS FOR MEASURING THE $O_2$ CONTENT OF A GAS

**Joseph V. Bienkowski; Donald J. Romime, and Donald C. Davis, all of Fostoria, Ohio, assignors to Bendix Autolite Corporation, Fostoria, Ohio**

**Filed Sep. 26, 1977, Ser. No. 836,335**

**Int. Cl.**[2] **G01N** *27/04;* **G01R** *27/02*

**U.S. Cl. 23—232 E** **18 Claims**



13. A method for providing an electrical signal which is related to the $O_2$ content of a gas, the method comprising:
electrically connecting a first resistor comprised of titania in series with a second resistor comprised of stabilized zirconia material, said second resistor having about the same resistance-temperature characteristics as said first resistor over a predetermined temperature range of said gas;
applying a potential across the resistors;
exposing said resistors to a gas;
obtaining a first electrical output across said titania resistor as an indication of the $O_2$ content of the gas;
obtaining a second electrical output which is a function of the voltage across both of said resistors; and
comparing said first electrical output to said second electri-

cal output and obtaining an output signal which is a function of said first and second output signals.

---

**4,147,514**

## TEST MEANS AND METHOD FOR DETECTING KETONE BODIES

**Thomas A. Magers, South Bend, and David L. Tabb, Elkhart, both of Ind., assignors to Miles Laboratories, Inc., Elkhart, Ind.**

**Filed Nov. 21, 1977, Ser. No. 853,390**
**Int. Cl.² G01N *33/16***
**U.S. Cl. 23—230 B** **25 Claims**

1. A test composition for detection of ketones at alkaline pH which comprises a soluble nitroprusside in combination with a compound to produce said alkaline pH and at least one inorganic salt of a metal selected from the group consisting of magnesium and calcium.

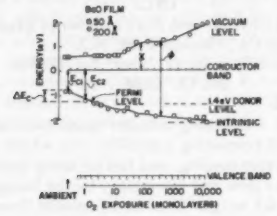
---

**4,147,515**

## ELECTRO-CHEMICAL SENSORS FOR GAS DETECTION IN ELECTRON TUBES

**George A. Haas, Alexandria, Va.; Richard F. Greene, Bethesda, and Arnold Shih, Gaithersburg, both of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Dec. 22, 1977, Ser. No. 863,363**
**Int. Cl.² G01N *27/04***
**U.S. Cl. 23—232 E** **10 Claims**




1. A method of predicting a change in the work function of an emitter in a vacuum container due to contamination by gases present in said vacuum container comprising the steps of:

exposing a body of barium oxide to the atmosphere in the vacuum container, said body having a known initial conductivity; and

measuring the conductivity of said body after said exposure to the atmosphere in the container, a change in the conductivity indicating a change in the work function of the emitter,

said change in work function being given approximately by the change in the conduction-band edge, $\Delta E_c$, with respect to the Fermi level of said body,

said change in the conduction-band edge, $\Delta E_c$, being related to the ratio of the measured conductivity, $\sigma_2$, to the initial conductivity, $\sigma_1$, according to the approximation

$$\sigma_2/\sigma_1 \approx e-(\Delta E_c)kT$$

where k is the Boltzmann constant and T is the temperature in degrees Kelvin at which the conductivity is measured.

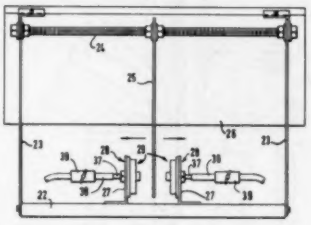
---

**4,147,516**

## OSCILLATORY MECHANISMS

**Norman A. deBruyne, 3700 Brunswick Pike, Princeton, N.J. 08540**

**Filed Apr. 7, 1977, Ser. No. 785,674**
**Claims priority, application United Kingdom, Apr. 9, 1976, 14545/76; Apr. 27, 1976, 17025/76**
**Int. Cl.² B06B *1/18*; F01L *15/02***
**U.S. Cl. 422—99** **13 Claims**




1. A mechanism for oscillatory movement of at least one part of said mechanism comprising at least one member of said part having flexibility and being secured to, and so positioned on, said mechanism so that at least a portion of said member can be moved in an oscillatory path and a pair of means mounted on said mechanism adjacent said at least one portion for transmission of motion to said at least one portion, said at least one motion transmission means comprising at least one expansible chamber assembly having an inlet for a pressurized gaseous medium, a valveless outlet and an open passageway between said inlet and said outlet whereby said medium will flow through said assembly until said outlet is closed, and means connecting said inlet to a source of said pressurized medium;

said at least one portion of said member forming a valve to close said outlet when the oscillatory path of said at least one portion brings said at least one portion into contact with said outlet thereby causing said chamber to be expanded under the action of said pressurized medium to impart motion to said at least one portion in a direction opposite to the motion of said at least one portion when it closed said outlet thereby removing said at least one portion from its closure relationship with said outlet as said at least one portion moves toward said other motion transmission means.

---

**4,147,517**

## THREE-WAY-VALVE

**Jörg-Peter Körner, Hagen; Josef Stalzer; Günther Dornhoff, both of Hagen-Emst, and Manfred Köpl, Hagen, all of Fed. Rep. of Germany, assignors to Uhde, GmbH, Dortmund, Fed. Rep. of Germany**

**Filed Apr. 7, 1977, Ser. No. 785,548**
**Claims priority, application Fed. Rep. of Germany, Apr. 7, 1976, 2615027**
**Int. Cl.² B01J *3/04***
**U.S. Cl. 422—242** **3 Claims**

1. Three-way valve assembly for reactors comprising

a. a lower valve body having a longitudinal duct providing a chemical reaction space and connected at its ends to reactor elements respectively for working pressures over 1000 bar and for operating temperatures of more than 250° C.,

b. an upper valve part provided with an inlet/outlet duct transverse to and communicating with an intermediate portion of said longitudinal duct,

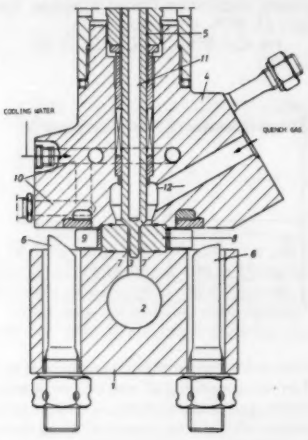
c. a shiftable valve in said upper valve part,

d. a lens type seal between said upper and lower valve parts, and providing a valve seat adapted to be covered and uncovered by said valve,

e. said lens type seal being of a material having a thermal

conductivity at least 50% lower than that of the valve material,

f. the wall thickness of the lower valve part in the region of the lens type seal being at least 35% less than wall thickness of the adjacent valve part wall areas on either side thereof, and




g. fasteners connecting the upper and lower valve parts in the area of the reduced wall thickness of said lower valve part thereby securely to tighten the valve parts.

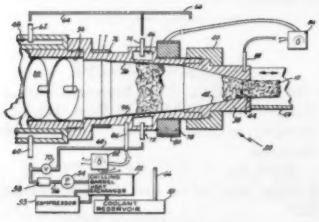
---

**4,147,518**

## EXTRUSION APPARATUS FOR MAKING FIRE KINDLING DEVICE

**Kenneth L. DeHart, Wyoming, and Raymond C. Wing, Cascade Township, Kent County, both of Mich., assignors to Pine Rest Christian Rehabilitation Services, Grand Rapids, Mich.**

**Filed Mar. 2, 1977, Ser. No. 773,835**
**Int. Cl.[2] C10L *5/22, 11/08;* B30B *11/00***
**U.S. Cl. 44—13** **13 Claims**



1. Extrusion apparatus for extruding a composite mass such as a composition of flammable wax and wood chips to form fire kindling material comprising a rotatable extrusion member; means for rotating said extrusion member about a predetermined axis; an extrusion chamber closely surrounding and coaxial with said extrusion member and extending beyond the end of said extrusion member, and a nozzle extending beyond and coaxial with said extrusion chamber; means for inserting a mixture of wood particles and wax with said wax in solid form under a predetermined pressure in said extrusion chamber; and a coolant system for cooling said extrusion chamber to control the quality and consistency of the extruded mass, said system including at least one hollow, liquid-tight jacket surrounding said extrusion chamber and cooling means for circulating a liquid coolant through said jacket at a predetermined temperature.

7. The extrusion apparatus of claim 1 wherein said extrusion nozzle includes an extrusion passageway having a first conical section receiving said composite mass from said extrusion chamber and converging toward a second cylindrical section coaxial with said first section and opening to the exterior of said extrusion apparatus.

---

**4,147,519**

## COAL SUSPENSIONS IN ORGANIC LIQUIDS

**Edgar W. Sawyer, Jr., Hagerstown, Md., assignor to International Telephone & Telegraph Corp., Nutley, N.J.**

**Filed Jun. 27, 1977, Ser. No. 810,121**
**Int. Cl.[2] C10L *1/32***
**U.S. Cl. 44—51** **15 Claims**

1. A suspension of carbonaceous combustible solids in a hydrocarbon liquid having a relatively high viscosity at low shear and a relatively low viscosity at high shear comprising:

from 35–70% by weight of carbonaceous combustible solids in particulate form;

from 56–28% by weight of the hydrocarbon liquid;

from 3.0–0.5 weight percent of a gelling grade clay to cause the hydrocarbon liquid to become gelled; and

from 1.0–0.1 weight percent of an organic surfactant of the type that will disperse the clay in the liquid and will not prevent reflocculation and formation of a gel structure of the clay particles in the liquid, whereby the surfactant disperses the carbonaceous combustible solids and the clay within the suspension.

---

**4,147,520**

## COMBINATIONS OF OIL-SOLUBLE ALIPHATIC COPOLYMERS WITH NITROGEN DERIVATIVES OF HYDROCARBON SUBSTITUTED SUCCINIC ACIDS ARE FLOW IMPROVERS FOR MIDDLE DISTILLATE FUEL OILS

**Stephen Ilnyckyj, Maplewood, N.J., assignor to Exxon Research & Engineering Co., Florham Park, N.J.**

**Filed Mar. 16, 1977, Ser. No. 777,960**
**Int. Cl.[2] C10L *1/22***
**U.S. Cl. 44—62** **2 Claims**

1. A fuel oil comprising a major proportion of a middle distillate fuel oil containing n-paraffin wax which crystallizes from said oil during cooling, said fuel oil being improved in its low temperature flow and filterability by the incorporation of about 0.001 to 0.5 weight % of an oil-soluble flow and filterability improver composition comprising:

(a) 1 to 20 parts by weight of a synthetic polymer having the property of a wax nucleator in said oil which raises the temperature at which the onset of wax crystallization from said oil occurs during cooling, said nucleator being soluble in said oil at temperatures substantially above the saturation temperature of said wax in said oil, but which begins to crystallize from the oil as the oil is cooled towards said saturation temperature, said synthetic polymer comprising a copolymer of a major amount by weight of ethylene and in the range of about 9 to 16 wt. % vinyl acetate, said copolymer having a number average molecular weight (VPO) in the range of 500 to 50,000; and

(b) 1 to 100 parts by weight of an oil-soluble succinamic acid or its derivative having the property of a wax growth arresting function in said distillate which when added to said fuel oil lowers the temperature at which wax begins to crystallize from said oil during cooling, said acid or its derivative having the following formula

$$\begin{array}{l} R-CH-COX \\ \quad\quad | \\ \quad CH_2-COX^1 \end{array}$$

wherein: R is a straight chain aliphatic hydrocarbon

group having from 0 to 1 site of olefinic unsaturation (alkyl or alkenyl) attached at a secondary carbon atom to the succinyl group and is of 8 carbon atoms to 28 carbon atoms; one of X and $X^1$ is hydroxyl and the other is

$$-NYY^1$$

wherein N has its normal meaning of nitrogen and Y and $Y^1$ are aliphatic hydrocarbyl groups of from 14 to 28 carbon atoms and having a total of from about 30 to 52 carbon atoms and the other of X and $X^1$ is of the formula:

$$OH(NHY^2Y^3)_n$$

wherein n varies from 0 to 1, $Y^2$ and $Y^3$ are selected from the class of hydrogen, an aliphatic hydrocarbon of from 1 to 30 carbon atoms and an oxyaliphatic hydrocarbon of from 1 to 30 carbon atoms, and $Y^2$ and $Y^3$ may be taken together with the nitrogen to which they are attached to form a heterocyclic ring of from 5 to 7 annular members.

---

**4,147,521**

## ACID WASHED MONTMORILLONITE CLAYS FOR IMPROVING ELECTROSTATIC PRECIPITATION OF DUST PARTICLES

**Vincent M. Albanese, Lockport, Ill., assignor to Nalco Chemical Company, Oak Brook, Ill.**

**Filed Dec. 15, 1977, Ser. No. 860,794**
**Int. Cl.² B03C *1/00***
**U.S. Cl. 55—2** **2 Claims**

1. A method of improving the conductivity of particles entrained in a stream of particle-laden gas formed by the burning of coal, which particles are collected by an electrostatic precipitator which comprises treating said gas containing particles prior to contact with the electrostatic precipitator at a temperature not greater than about 1800° F. with a resistivity-decreasing amount of acid washed montmorillonite clay and thereafter passing the gas to the electrostatic precipitator.

---

**4,147,522**

## ELECTROSTATIC DUST COLLECTOR

**Edward J. Gonas, Tonawanda, and Dennis J. Helfritch, N. Tonawanda, both of N.Y., assignors to American Precision Industries Inc., Buffalo, N.Y.**

**Filed Apr. 23, 1976, Ser. No. 679,857**
**Int. Cl.² B01D *46/04, 50/00, 53/32;* B03C *3/80***
**U.S. Cl. 55—6** **14 Claims**

4. A method of separating particulate matter from a gas stream comprising:

(a) moving gas from said stream containing said particulate matter through a hollow, elongated electrostatic charging zone from an inlet at one end thereof to an outlet at the opposite end thereof and applying unipolarity voltage to said zone to apply the same polarity electrostatic charge to each of the particles of said particulate matter in the gas stream;

(b) moving said gas from said charging zone immediately to an electrically neutral, hollow and elongated fabric filter element and through said electrically neutral fabric filter element in a manner such that the electrically charged particulate matter is deposited on said filter element, said

filter element having an inlet at one end thereof connected to said outlet of said charging zone; and

(c) withdrawing clean gas from said filter element.

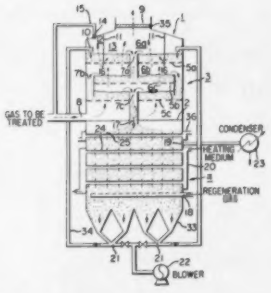
---

**4,147,523**

## APPARATUS FOR CONTINUOUSLY TREATING GAS WITH ACTIVATED CARBON

**Masanori Izumo, Neyagawa, Japan, assignor to Daikin Kogyo Co., Ltd., Osaka, Japan**

**Filed May 6, 1977, Ser. No. 794,624**
**Claims priority, application Japan, May 8, 1976, 51-52578**
**Int. Cl.² B01D *53/08***
**U.S. Cl. 55—208** **7 Claims**




1. An apparatus for treating a gas containing organic substances with activated carbon while regenerating substantially spent activated carbon with a regeneration gas, comprising

(a) an adsorption vessel including

a top outlet port for treated gas,

a plurality of perforated plates supported in said adsorption vessel so as to divide the adsorption vessel into vertically spaced, contiguous, contacting chambers, said perforated plates each being adapted to permit a flow of gas therethrough and to support a mass of fluidized activated carbon thereon, each of said contacting chambers being provided with a passage through which a moving mass of activated carbon flows downward by gravity, the uppermost of said contacting chambers including a vertical partition plate dividing the inner space thereof into a first subcontacting chamber and a second subcontacting cham-

ber, said first subcontacting chamber including a supply port adapted to receive regenerated activated carbon, said second subcontacting chamber including said outlet port for the treated gas and said passage for the uppermost perforated plate, said vertical partition plate including means adapted to allow activated carbon to flow therethrough from said first subcontacting chamber to said second subcontacting chamber,

an inlet conduit adapted to introduce untreated gas into the adsorption vessel at a point below the lowermost perforated plate, and

gas outlet conduit means connecting said inlet conduit for untreated gas with said first subcontacting chamber,

(b) a desorption vessel adapted to receive a moved bed of substantially spent activated carbon from said adsorption vessel and having

a port formed at the top of the desorption vessel and adapted so as to provide communication between the desorption vessel and the passage for moving activated carbon in the lowermost contacting chamber of the adsorption vessel, and to admit substantially spent activated carbon into the desorption vessel,

a regeneration gas supply port at the lower portion of the desorption vessel,

a regeneration gas discharge port at the upper portion of the desorption vessel,

means for heating activated carbon in the desorption vessel, and

a regenerated activated carbon discharge port at the bottom of the desorption vessel,

(c) recycling conduit means extending between said regenerated activated carbon discharge port and said regenerated activated carbon supply port in the adsorption vessel, and

(d) means for recycling the regenerated activated carbon from the desorption vessel to the adsorption vessel through said recycling conduit means.

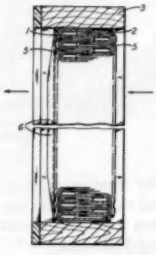
---

**4,147,524**

## FILTER UNIT

**Wayne L. Smith, Bradfordwoods, and Roger P. Wolf, Mars, both of Pa., assignors to Mine Safety Appliances Company, Pittsburgh, Pa.**

**Filed Apr. 24, 1978, Ser. No. 899,085**
**Int. Cl.[2] B01D *46/52***
**U.S. Cl. 55—521** **2 Claims**



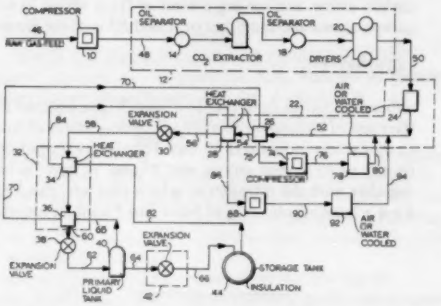
1. A filter unit comprising a strip of filter material, a plurality of laterally spaced parallel tapes extending along each side of the strip in engagement therewith, the strip and tapes being accordion-folded transversely thereof and forming a stack of integrally connected parallel filter sheets spaced apart by the portions of the tapes between them, each tape having at its side of the stack exposed portions, and a line of hardened adhesive extending along said exposed portions of each tape to connect them and form a stiffening band, whereby there are parallel stiffening bands extending across each side of said stack of filter sheets.

**4,147,525**

## PROCESS FOR LIQUEFACTION OF NATURAL GAS

**Robert A. Bradley, 18 Ralston Ave., Toronto, Ontario, Canada (M4C 3L5)**

**Continuation of Ser. No. 693,767, Jun. 8, 1976, abandoned. This application May 16, 1977, Ser. No. 797,549**
**Int. Cl.[2] F25J *3/06***
**U.S. Cl. 62—23** **6 Claims**




1. A continuous process for the liquefaction of natural gas comprising the steps of:

(a) regulating the pressure of the continuously flowing stream of natural gas to an input pressure in excess of 800 PSIG,

(b) cooling the continuously flowing stream of natural gas at the input pressure to a temperature of the order of about 0° F. in a multi-stage primary cooling step including a first cooling stage and a plurality of subsequent cooling stages,

(c) expanding the natural gas in a primary expansion step to reduce the pressure to 600 PSIG or less and a temperature of about −100° F.,

(d) cooling the natural gas at 600 PSIG or less in a secondary cooling step to the critical temperature of the gas and

(e) expanding the natural gas in a secondary expansion step to liquefy the gas at a convenient holding pressure for storage,

(f) a portion of the liquefied gas stream being withdrawn after the secondary expansion step and circulated as a cooling medium in the secondary cooling step and thereafter used as a cooling medium in said subsequent cooling stages of said primary cooling step, and thereafter returned to the continuously flowing stream before said primary expansion step at a point in the primary cooling step between the first cooling stage and said subsequent cooling stages at a pressure above the critical pressure of the natural gas.

---

**4,147,526**

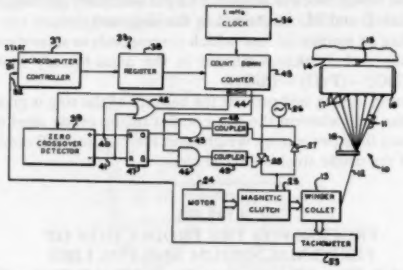
## GLASS FIBER PRODUCING AND COLLECTING APPARATUS

**John W. Lonberger, Newark, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio**

**Filed Dec. 30, 1977, Ser. No. 866,130**
**Int. Cl.[2] C03B *37/00***
**U.S. Cl. 65—11 W** **5 Claims**

1. Apparatus for producing continuous fibers from a supply of thermoplastic material comprising a feeder adapted to contain a molten supply of the material and having a plurality of orifices formed therein for issuing a like plurality of streams of the molten material, and means for attenuating the streams into fibers and for collecting said fibers into a wound package including collet means for supporting the package, electric motor means for rotating said collet and the supported package, and means for controlling the speed said motor means drives said collet comprising means for generating a digital signal indicative of a desired collet speed, an AC power source,

at least one controlled gate means for applying power from said source to said controlling means, and digital means re-




sponsive to said digital signal for triggering said gate means at a predetermined point in each half cycle of said AC power for controlling the speed of said collet.

---

**4,147,527**

## GLASS SHEET MOLDING ASSEMBLY

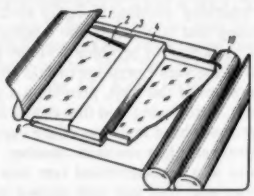
**Nikolai M. Bystrov, Khlebnikovo, Leningradskaya ulitsa, 19, kv. 27; Anatoly N. Simonov, Dmitrovskoe shosse, 11, kv. 63; Alexandr B. Levin, Snaiperskaya ulitsa, 4, kv. 210; Jury K. Meshkov, ulitsa Bolshaya Polyanka, 4/10, kv. 4; Anatoly A. Zakharov, Dmitrovskoe shosse, 161, kv. 12, and Alexei V. Kolbanev, ulitsa Dmitria Ulyanova, 14, korpus 1, kv. 6, all of Moscow, U.S.S.R.**

**Division of Ser. No. 670,527, Mar. 25, 1976, abandoned. This application Jan. 9, 1978, Ser. No. 867,877**

**Claims priority, application U.S.S.R., Mar. 28, 1975, 2117996**

**Int. Cl.[2] C03B *13/00***

**U.S. Cl. 65—183** **1 Claim**



1. A mold assembly for making articles of glass comprising, a flat first plate a rectangular first bar positionable on said plate resting on a major face thereof adjacent an edge of said plate, an L-shaped second bar positionable along an opposite edge of said flat plate with an upstanding ridge disposed inwardly of said edge; a third bar having an underside arcuate longitudinal recess along the full length thereof said third bar being positionable seated on said second bar with said arcuate longitudinal recess overlying said ridge and upwardly spaced therefrom, a second plate having shoulders on opposite side edges, a first of said shoulders positionable resting on said first bar and a second of said shoulders resting on said second bar, said second plate having a central region defining said shoulders and spaced inwardly away from said first bar defining an upstanding slot in the mold and spaced inwardly from the upstanding ridge on said second bar, and the central region of said second plate being disposed upwardly spaced from said major face of the first plate, whereby a mold cavity open at two opposite ends is defined for molding an article of glass therethrough as a sheet having an upstanding flange along one edge and an arcuate U-shaped flange open for assembly with other similar articles with corresponding U-shaped flanges defining a scarf joint.

**4,147,528**

## 6-OXOPYRIMIDINE PLANT GROWTH REGULATORS

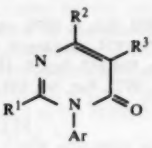
**Patrick J. McNulty, Wyndmoor, and Harlow L. Warner, Hatboro, both of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.**

**Continuation-in-part of Ser. No. 353,873, Apr. 23, 1973, abandoned. This application Aug. 19, 1977, Ser. No. 825,898**

**Int. Cl.[2] A01N *9/22***

**U.S. Cl. 71—92** **18 Claims**

1. A compound of the formula



wherein

$R^1$ is hydrogen, ($C_1$–$C_4$) alkyl, phenyl, chlorophenyl, methylphenyl, methoxyphenyl, nitrophenyl, dichlorophenyl, benzyl or chlorobenzyl;

$R^2$ is ($C_1$–$C_4$) alkyl, phenyl, chlorophenyl, methylphenyl, methoxyphenyl, nitrophenyl, dichlorophenyl, benzyl or chlorobenzyl;

$R^3$ is carboxy, carboxylate, carb ($C_1$–$C_{12}$) alkoxy, carbamoyl, ($C_1$–$C_4$) alkyl or di ($C_1$–$C_4$) alkyl carbamoyl, cyano, sulfo, sulfonate, ($C_1$–$C_{12}$) alkoxysulfonyl or sulfonamide;

Ar is unsubstituted phenyl, α-naphthyl or β-naphthyl or phenyl, α-naphthyl or β-naphthyl substituted with one or more substituents selected from the group consisting of ($C_1$–$C_4$) alkyl, phenyl, ($C_1$–$C_4$) alkoxy, phenoxy, halo, nitro, trifluoromethyl, hydroxy, ($C_2$–$C_6$) alkoxyalkyl, ($C_2$–$C_6$) alkoxyalkoxy, amino, ($C_1$–$C_4$) alkylamino, di ($C_1$–$C_4$) alkylamino, cyano, carboxy, carb ($C_1$–$C_4$) alkoxy, carbamoyl, ($C_1$–$C_4$) alkylcarbamoyl, di ($C_1$–$C_4$) alkylcarbamoyl, sulfo, sulfonamide, ($C_1$–$C_4$) alkylcarbonyl, carboxy ($C_1$–$C_4$) alkyl, ($C_1$–$C_4$) alkanoyloxy, halo ($C_1$–$C_4$) alkyl, ($C_1$–$C_4$) alkanoylamido, ($C_1$–$C_4$) alkylthio, ($C_1$–$C_4$) alkylsulfinyl, ($C_1$–$C_4$) alkylsulfonyl and the alkali metal, alkaline earth metal, transition metal or quaternary ammonium salts or ($C_1$–$C_{12}$) alkyl esters thereof.

7. A growth regulant composition which comprises a compound according to claim 1 and an agronomically acceptable carrier.

---

**4,147,529**

## N-BENZYL-2,6-DINITRO-3-AMINO-4-TRIFLUOROMETHYLANILINES AS HERBICIDES

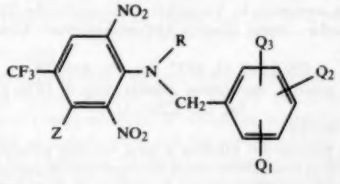
**Merrill Wilcox, 2911 NW. 30th Ter., Gainesville, Fla. 32601**

**Division of Ser. No. 808,761, Jun. 22, 1977, Pat. No. 4,116,667, which is a division of Ser. No. 533,045, Dec. 16, 1974, Pat. No. 4,046,809. This application Jul. 12, 1978, Ser. No. 923,852**

**Int. Cl.[2] A01N *9/20***

**U.S. Cl. 71—121** **5 Claims**

1. A method for controlling the growth of weeds which comprises applying thereto a herbicidally effective amount of a compound of the formula



in which

R is lower alkyl,

Z is amino, lower alkylamino or di lower alkylamino,

each of $Q_1$ and $Q_2$ is hydrogen, halogen, lower alkyl or methoxy, and

$Q_3$ is hydrogen, lower alkyl or methoxy.

---

**4,147,530**

## REDUCTIONS OF INORGANIC SUBSTRATES WITH CHELATED SODIUM HYDRIDOALUMINATES OR HYDRIDOBORATES

**Arthur W. Langer, Jr., Watchung, N.J., and William M. Bunting, Baton Rouge, La., assignors to Exxon Research & Engineering Co., Florham Park, N.J.**

**Continuation-in-part of Ser. No. 655,891, Feb. 6, 1976, which is a division of Ser. No. 527,648, Nov. 27, 1974, abandoned, which is a continuation-in-part of Ser. No. 504,152, Sep. 9, 1974, abandoned. This application Nov. 7, 1977, Ser. No. 849,317**

**Int. Cl.² C22B *15/12, 23/04***

**U.S. Cl. 75—0.5 A** **17 Claims**

1. A process for reducing inorganic substrates which comprises the step of reacting a reducible inorganic substrate with a chelate compound, said chelate compound formed by mixing a sodium hydrido compound and a chelating polyfunctional hydrocarbyl Lewis base in an inert hydrocarbon medium at −100° to +200° C., and recovering metals.

---

**4,147,531**

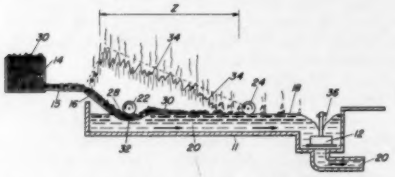
## METHOD AND APPARATUS FOR REMOVING SURFACE CONTAMINANTS FROM METALLIC SCRAP

**Ronald E. Miller, Murrysville, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.**

**Filed Jul. 27, 1977, Ser. No. 819,602**

**Int. Cl.² C21B *1/00***

**U.S. Cl. 75—44 S** **7 Claims**



1. A method for melting surface contaminated metallic scrap comprising, in sequence, the steps of:

continuously depositing surface contaminated scrap onto the surface of molten metal;

moving the floating scrap along the molten surface for a time sufficient for the heat from the molten metal to effectuate substantially complete removal of the contaminants from the scrap; and

forcibly submerging any unmelted, decontaminated scrap into the molten metal after the contaminants are substantially completely removed.

---

**4,147,532**

## PROCESS FOR PILOTING OR CONTROLLING A STEEL REFINING PROCESS

**Ernst Vogl, Trofaiach, and Klaus Kammerhofer, Leoben, both of Austria, assignors to Vereinigte Osterreichische Eisen- und Stahlwerke - Alpine Montan Aktiengesellschaft, Vienna, Austria**

**Filed Jul. 15, 1977, Ser. No. 816,205**

**Claims priority, application Austria, Aug. 4, 1976, 5780/76**

**Int. Cl.² C21C *5/30***

**U.S. Cl. 75—52** **2 Claims**

1. In a process for piloting a steel refining process for the production of low carbon steels having a carbon content below 0.1 percent by weight, comprising charging all charging materials into the refining vessel at the beginning of the refining process and blowing oxygen into the refining vessel in an amount sufficient to produce an FeO content in the slag contained in said refining vessel which FeO content is effective for slagging the Mn and P; the improvement comprising

producing an FeO content in the slag which is in excess of the stoichiometric amount of FeO necessary for slagging both P and Mn contained in the slag; and

adding an amount of lime which corresponds to saturation of lime and dicalcium silicate in the quasi-ternary system $(CaO)'—(FeO)'—(SiO_2)'$

wherein during said process the basicity of the slag is greater than 2.8; wherein the Mn content of the crude steel is at least 0.20 percent by weight and the maximum P content of the crude steel is 0.03 percent.

---

**4,147,533**

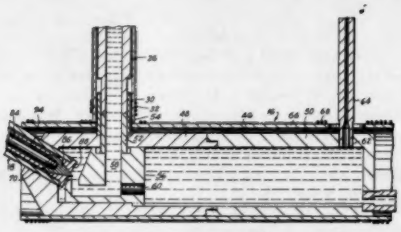
## PROCESS FOR THE PRODUCTION OF FERRO-MAGNESIUM AND THE LIKE

**Richard A. Flinn, 140 Underdown Dr., and Paul K. Trojan, 3939 Vorhies Rd., both of Ann Arbor, Mich. 48105**

**Filed Jul. 11, 1977, Ser. No. 814,345**

**Int. Cl.² C21C *7/02***

**U.S. Cl. 75—58** **10 Claims**



1. A process for the production of a solid metallic composition containing at least two metallic constituents wherein the melting temperature of a first constituent exceeds the boiling temperature of a second constituent at atmospheric pressure said process comprising forming a liquid melt of said first constituent, forming said liquid melt into a liquid body having a depth at least sufficient to produce a static pressure head therein in excess of the vapor pressure of said second constituent at the temperature of the melt, providing a supply of said second constituent, introducing said first constituent as a liquid melt at a static pressure head in excess of the vapor pressure of said second constituent into a reaction chamber, metering said second constituent at a predetermined rate into said reaction chamber, retaining said first and said second constituents in said reaction chamber to form a mixture of said constituents in which at least a portion of said second constituent is in solution with said first constituent, withdrawing said mixture from said reaction chamber and solidifying said mixture at a static pressure head in excess of the vapor pressure of said second constituent and at a sufficiently rapid rate to retain a portion of said second constituent rejected from said mixture during cooling thereof as a dispersion of small particles of said second constituent in a matrix of said first constituent.

---

**4,147,534**

## METHOD FOR OBTAINING Mg AND Ca THROUGH CARBON REDUCTION

**Fumio Hori, 23, 15ban „ Kentanicho, Nishinomiyashi, Hyoken, Japan**

**Filed Aug. 12, 1977, Ser. No. 824,081**

**Claims priority, application Japan, Aug. 16, 1976, 51-98012**

**Int. Cl.² C22B *29/00, 35/00***

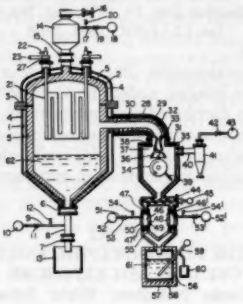
**U.S. Cl. 75—67 R** **5 Claims**

1. A method of obtaining a metal selected from the group consisting of Mg, Be, Sr, Ba and Ca through a carbon reduction of their oxides at elevated temperatures, which comprises:

(a) introducing a mixed gas consisting of said metal and CO produced from said carbon reduction into a divergent

nozzle operated under the condition of underexpansion, under thermal control not to allow said constituent gases to react with each other;

(b) ejecting said mixed gas through said divergent nozzle, and enabling said mixed gas to adiabatically expand at a



speed exceeding the molecular motion speeds of said constituent gases, thereby causing said mixed gas to cool down instantaneously to temperatures at which said constituent gases cannot react with each other;

(c) separating said mixed gas into said metal and CO and collecting said metal.

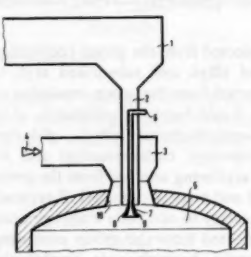
---

**4,147,535**

## PROCEDURE FOR PRODUCING A SUSPENSION OF A POWDERY SUBSTANCE AND A REACTION GAS

**Launo L. Lilja, and Valto J. Makitalo, both of Pori, Finland, assignors to Outokumpu Oy, Outokumpu, Finland**

**Filed May 16, 1977, Ser. No. 797,505**
**Int. Cl.[2] C22B *15/00***
**U.S. Cl. 75—74** **2 Claims**



1. A process for forming a suspension of a powdery substance and a reaction gas by causing the powdery substance to flow downwardly as an annular flow into the reaction space and conducting the reaction gas downwardly to encircle the annular flow of powdery substance, comprising gradually spreading the annular flow of the descending powdery substance to the sides with the aid of at least one sliding surface with progressively increasing curvature disposed within the reaction space, so that the flow of powdery substance which has been spread to be laterally directed will meet the reaction gas flow substantially at right angles in the reaction space and the terminal edge in the direction of sliding of the powdery substance is horizontal.

**4,147,536**

## ALLOY FOR OCCLUSION OF HYDROGEN

**Yasuaki Osumi, Minou; Hiroshi Suzuki, Ikeda; Akihiko Kato, Matsubara; Masanori Nakane, Takatsuki, and Yoshizo Miyake, Toyonaka, all of Japan, assignors to Agency of Industrial Science & Technology and Ministry of International Trade & Industry, both of Tokyo, Japan**

**Filed Oct. 7, 1977, Ser. No. 841,131**
**Claims priority, application Japan, Oct. 16, 1976, 51-124055**
**Int. Cl.[2] C22C *19/00***
**U.S. Cl. 75—134 F** **4 Claims**

1. An alloy for the occlusion of hydrogen, which alloy is represented by the generic formula: $MmNi_{5-X}Co_X$, wherein Mm represents Mischmetal and X a number having the value of from 0.1 to 4.9, Mm containing, by weight, 25 to 30% of La, 40 to 45% of Ce, 10 to 15% of Pr, 4 to 5% of Nd, 4 to 7% of Sm+Gd, 3 to 5% of Fe, 0.1 to 1% of Si, 0.1 to 2% of Mg and 0.1 to 1% of Al.

---

**4,147,537**

## COMPOSITION OF MATERIAL FOR A RUST-RESISTANT STEEL FOR USE AT HIGH TEMPERATURES

**Silvestre S. Torres, 30 Poniente No. 1512, Interior 2, Puebla, Pue., Mexico**

**Continuation-in-part of Ser. No. 699,559, Jun. 24, 1976, abandoned. This application Mar. 29, 1978, Ser. No. 891,258**
**Int. Cl.[2] C22C *22/00***
**U.S. Cl. 75—134 M** **2 Claims**

1. A rust-resistant alloy for high temperature use consisting essentially of:

1.0%–2.0% silicon
0.9%–1.9% copper
0.5%–0.12% carbon
0.5%–8.9% iron
0.2%–2.3% titanium
15.0%–22.0% chromium
2.5%–4.0% molybdenum
5.0%–10.0% aluminum
0.1%–0.3% selenium

the balance being manganese present in amount less than about 70.0%.

---

**4,147,538**

## COBALT OR COBALT ALLOY COMPOSITE MATERIALS REINFORCED WITH CONTINUOUS SILICON CARBIDE FIBERS AND A METHOD FOR PRODUCING THE SAME

**Seishi Yajima; Hideo Kayano, both of Ohnuki; Chiaki Asada, and Makoto Saito, both of Nagoya, all of Japan, assignors to The Research Institute for Iron, Steel and other Metals of the Tohoku University, Sendai, Japan**

**Filed Jan. 21, 1977, Ser. No. 761,168**
**Claims priority, application Japan, Jan. 29, 1976, 51-7877**
**Int. Cl.[2] B22F *3/00***
**U.S. Cl. 75—229** **2 Claims**

1. Cobalt or cobalt alloy composite materials reinforced with continuous silicon carbide fibers having excellent tensile strength and Young modulus, in which the wettability of metallic cobalt or cobalt alloy and the silicon carbide fibers is improved by combining 20–98% by volume the cobalt metal matrix and 80–2% by volume of silicon carbide fibers containing 0.01%–30% by weight of free carbon obtained by baking spun fibers consisting mainly of an organosilicon high molecular weight compound.

4,147,539

## PREPARATION OF CUPOLA FLUX

George T. Kekish, Chicago, Ill., assignor to Nalco Chemical Company, Oak Brook, Ill.

Filed Jan. 12, 1978, Ser. No. 868,786
Int. Cl.[2] C21B 5/04
U.S. Cl. 75—257 4 Claims

1. A flux for fluidizing slag in a cupola comprising a briquette which is composed of a major portion of alumina and an alkali metal base in an amount to provide an $Al_2O_3$:$Na_2O$ ratio ranging from 1:0.4 to 1:0.8 and from 5 up to 50% by weight of a binder from the group consisting of a montmorillonite clay, alumino silicate zeolites, sodium aluminate and aluminum phosphate, said briquette being characterized as being able to substantially maintain its physical integrity at about 1000° C. for about 1 hour.

---

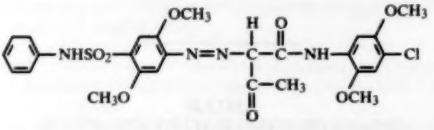
4,147,540

## COLOR ELECTROPHOTOGRAPHIC DEVELOPER SYSTEM EMPLOYING ONE CARRIER HAVING A COATING OF RESIN AND COPPER TETRA-4-(OCTADECYLSULFONOMIDO)PHTHALOCYANINE

Joseph Mammino, Penfield, and Franklin Jossel, Rochester, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 617,772, Sep. 29, 1975, Pat. No. 4,066,563. This application Aug. 1, 1977, Ser. No. 820,525
The portion of the term of this patent subsequent to Oct. 4, 1994, has been disclaimed.
Int. Cl.[2] G03G 13/01
U.S. Cl. 96—1.2 9 Claims

1. A color electrophotographic imaging process comprising charging a photoconductive member, exposing said photoconductive member to an original to be reproduced through a filter of one color thereby selectively discharging said photoconductive member, developing the electrostatic image formed thereby with a developer of a complementary color, said developer being one member of the group consisting of copper tetra-4-(octadecylsulfonomido) phthalocyanine cyan toner and a coated steel carrier, said coating comprising a resin and copper tetra-4-(octadecylsulfonomido) phthalocyanine colorant, 2,9-dimethyl-quinacridone magenta toner and said coated steel carrier, and yellow toner the colorant having the formula



and said coated steel carrier; charging said photoconductor for a second time and selectively exposing said photoconductor to the same image through a filter of another primary color, developing the latent electrostatic image formed thereby with a developer of a complementary color, said developer being another member selected from the group consisting of copper tetra-4-(octadecylsulfonomido) phthalocyanine cyan toner and said coated steel carrier, 2,9-dimethyl-quinacridone magenta toner and said coated steel carrier, and said yellow toner and said coated steel carrier; charging said photoconductive member for a third time, exposing said photoconductive member for a third time, exposing said photoconductor to the same image through a filter of the remaining primary color and developing the latent electrostatic image with a complementary developer, said developer being the remaining developer of the group consisting of copper tetra-4-octadecylsulfonomido) phthalocyanine cyan toner and said coated steel carrier, 2,9-dimethyl-quinacridone magenta toner and said coated steel carrier, and said yellow toner with said coated steel carrier.

4,147,541

## ELECTROSTATIC IMAGING MEMBER WITH ACID LUBRICANT

Nero R. Lindblad, Palmyra; Gordon E. Johnson, Webster, and James H. Sharp, Rochester, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 277,544, Aug. 3, 1972, Pat. No. 3,973,843. This application Jun. 19, 1974, Ser. No. 480,780
Int. Cl.[2] G03C 5/04, 5/08
U.S. Cl. 96—1.5 7 Claims

1. An electrostatographic imaging member comprising a photoconductive imaging surface provided with an adherent film of lubricant distributed over substantially all of said surface, said lubricant having at least one compound selected from the group consisting of phthalic acid, isophthalic acid, terephthalic acid, the metal and ammonium salts thereof.

---

4,147,542

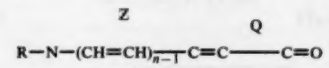
## SILVER HALIDE PHOTOGRAPHIC EMULSIONS FOR USE IN FLASH EXPOSURE

Teiji Habu; Tomio Nakajima; Eiichi Sakamoto; Noboru Fujimori, and Kiyomitsu Mine, all of Hino, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Division of Ser. No. 690,042, May 25, 1976. This application Oct. 28, 1977, Ser. No. 846,527
Claims priority, application Japan, May 27, 1975, 50-63672
Int. Cl.[2] G03C 5/04
U.S. Cl. 96—27 E 4 Claims

1. A process for forming an image by use of a silver halide photographic material comprising a silver halide photographic emulsion layer to be used for a flash exposure which process comprises imagewise exposing the photographic material to light for less than 1/10000 second and developing the exposed photographic material to obtain the image, the improvement which comprises the photographic emulsion layer comprising at least one compound containing a metal belonging to Group VIII of the periodic table in an amount of $10^{-8}$ to $5 \times 10^{-7}$ mole per mole of silver halide and at least one of the sensitizing dyes represented by the following general formula (I) or (II) and capable of sensitizing silver halide less than 550 nm:

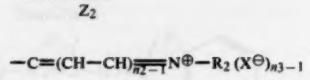
General formula I



wherein R is selected from the group consisting of alkyl, allyl, aryl, substituted alkyl, and substituted aryl, the substituted alkyl being selected from the group consisting of $\beta$-sulfoethyl, $\gamma$-sulfopropyl, $\delta$-sulfobutyl, $\gamma$-sulfobutyl, $\beta$-($\gamma$-sulfopropoxy)ethyl, $\beta$-($\delta$-sulfothiobutoxy)ethyl, $\beta$-hydroxyethyl, $\beta$-hydroxy-$\gamma$-sulfopropyl, carboxymethyl and $\beta$-carboxyethyl, the substituted aryl being selected from the group consisting of p-chlorophenyl and p-carboxyphenyl; Z represents a non-metallic group necessary to complete a nitrogen-containing heterocyclic ring selected from the group consisting of pyrroline, thiazoline, thiazole, benzothiazole, naphthothiazole, selenazole, benzoselenazole, naphthoselenazole, oxazole, benzoxazole, naphthoxazole, imidazole, benzoimidazole, pyridine, quinoline and indole; Q represents a non-metallic group necessary to complete a substituted or unsubstituted rhodanine, thiohydantoin or thiooxazolidin-dione ring, said substituents selected from the group consisting of lower alkyl, lower alkoxy, sulfoalkyl, carboxyalkyl, hydroxyalkyl, allyl and aryl; and n represents an integer of 1 or 2;

General formula II

-continued



wherein $R_1$ and $R_2$ individually are selected from the group consisting of alkyl, allyl, aryl, substituted alkyl, and substituted aryl, the substituted alkyl being selected from the group consisting of β-sulfoethyl, γ-sulfopropyl, δ-sulfobutyl, γ-sulfobutyl, β-(γ-sulfopropoxy)ethyl, β-(δ-sulfothiobutoxy)ethyl, β-hydroxyethyl, β-hydroxy-γ-sulfopropyl, carboxymethyl and β-carboxyethyl, and the substituted aryl being selected from the group consisting of p-chlorophenyl and p-carboxyphenyl; $Z_1$ and $Z_2$ individually represent a non-metallic group necessary to complete a pyridine, pyrroline, oxazole, thiazole, or selenazole ring; $X^-$ represents an anion; and $n_1$, $n_2$ and $n_3$ individually represent an integer of 1 or 2, provided that $n_3$ is 1 when a sensitizing dye of the general formula forms an inner salt.

---

**4,147,543**

## DEVELOPER COMPOSITIONS FOR HIGH CONTRAST DIFFUSION TRANSFER PHOTOGRAPHIC MATERIALS AND PROCESS THEREFOR

**Kikuo Kubotera; Eiichi Mizuki; Masato Satomura, all of Asaka; Haruhiko Iwano, and Tadahiro Fujiwara, both of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan**

**Filed Mar. 30, 1973, Ser. No. 346,383**
**Claims priority, application Japan, Apr. 1, 1972, 47-32870**
**Int. Cl.[2] G03C *5/54***
**U.S. Cl. 96—29 R** **25 Claims**

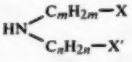
12. In a photographic silver salt diffusion transfer development process, the improvement of forming positive images of litho-type photographic characteristics by using a developer composition comprising

(1) a developing agent,
(2) a silver halide solvent,
(3) an alkaline agent,
(4) an amino compound represented by the following formula Ia, Ib or Ic or a mixture thereof, and
(5) a mercapto-group free imidazole compound represented by the following formula II or a mixture thereof:

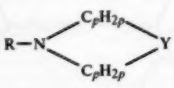
Formula I

(a) $NH_2—C_mH_{2m}—X$

wherein X represents a hydrogen atom, a hydroxyl group, a carboxyl group or an amino group, and m represents a natural number of 0–12, but X represents a hydroxyl group when m is 0,

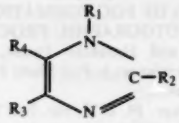


wherein X and X′ each represents a hydrogen atom, a hydroxyl group, a carboxyl group or an amino group, and m and n represent each a natural number of 0–12, but X and/or X′ represents a hydroxyl group when m and/or n is 0,



wherein Y represents an oxygen atom, —$CH_2$— or NR′, R and R′ each represents a hydrogen atom, an acyl group, an alkyl group or a substituted alkyl group, and p represents 2 or 3,

Formula II



wherein $R_1$ represents a hydrogen atom, an alkyl group, a substituted alkyl group, a vinyl group or an allyl group, $R_2$ represents a hydrogen atom, an alkyl group or a substituted alkyl group, $R_3$ represents a hydrogen atom or an alkyl group, and $R_4$ represents a hydrogen atom, an alkyl group or a substituted alkyl group.

---

**4,147,544**

## PHOTOGRAPHIC PRODUCTS AND PROCESSES EMPLOYING NOVEL NONDIFFUSIBLE PYRIDYLAZONAPHTHOL DYE-RELEASING COMPOUNDS

**Richard B. Anderson; Elaine H. Hoffmeister, and Richard A. Landholm, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Sep. 12, 1977, Ser. No. 832,499**
**Int. Cl.[2] G03C *7/00, 5/54, 1/40, 1/10***
**U.S. Cl. 96—29 D** **34 Claims**

31. A process for producing a photographic transfer image in color in an imagewise-exposed photographic element comprising a support having thereon at least one photosensitive silver halide emulsion layer, said emulsion layer having associated therewith a nondiffusible compound having at least one releasable 4-alkoxy-2-(5-nitro-2-pyridylazo)-1-naphthol dye moiety, said compound containing a ballasted carrier moiety which is capable of releasing said diffusible azo dye as a function of development of said silver halide emulsion layer under alkaline conditions, the alkyl of said alkoxy group being an alkyl or substituted alkyl group of 1 to about 8 carbon atoms, said process comprising:

(1) treating said photographic element with an alkaline processing composition in the presence of a silver halide developing agent to effect development of each of the exposed silver halide emulsion layers;
(2) said dye-releasing compound then releasing said diffusible azo dye imagewise as a function of said development of each of said silver halide emulsion layers;
(3) at least a portion of said imagewise distribution of said azo dye diffusing to a dye image-receiving layer; and
(4) contacting said imagewise distribution of said azo dye with metal ions, thereby forming a metal-complexed, azo dye transfer image.

---

**4,147,545**

## PHOTOLITHOGRAPHIC DEVELOPING COMPOSITION WITH ORGANIC LITHIUM COMPOUND

**William Rowe, Westfield, N.J., and Eugene Golda, Monsey, N.Y., assignors to Polychrome Corporation, Yonkers, N.Y.**

**Filed Nov. 2, 1972, Ser. No. 302,994**
**Int. Cl.[2] G03C *5/34;* G03F *7/08***
**U.S. Cl. 96—49** **9 Claims**

1. A composition adapted for developing exposed diazo-sensitized photosensitive coatings on a substrate to remove therefrom non-image areas which comprises an aqueous solution of a water-miscible solvent and lithium benzoate wherein the concentration of said lithium salt is from 5% to 25% by weight of the total weight of the ingredients of said composition, said solution having a pH of from about 5 to about 12.

**4,147,546**

## PREVENTION OF FOG FORMATION IN COLOR PHOTOGRAPHIC PROCESS

**Isao Shimamura, and Haruhiko Iwano, both of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan**

**Filed Apr. 19, 1977, Ser. No. 788,879**
**Claims priority, application Japan, Apr. 19, 1976, 51-44780**
**Int. Cl.[2] G03C** *5/38, 7/16, 5/26, 5/32*
**U.S. Cl. 96—60 R** **16 Claims**

1. In a process of forming photographic images by processing an imagewise exposed and color developed photographic element comprising a support having at least one photographic layer with an image-wise distributed material possessing a catalytic activity thereon with a photographic processing solution containing at least a cobalt (III) complex having a coordination number of 6 in the presence of a primary aromatic amine developing agent, the improvement which comprises preventing the formation of fog on the photographic images by contacting the photographic processing solution with one side of a fine open-cell porous diaphragm having a mean pore size of 0.1 to 1000 microns of a hydrophobic material comprising higher than 50% polytetrafluoroethylene content, the other side of which is in contact with an aqueous acid solution having an acid concentration of about 0.001 to 10 mol/l, whereby fogging components are removed from the processing solution into the acid solution through the porous diaphragm.

---

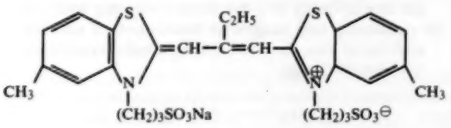
**4,147,547**

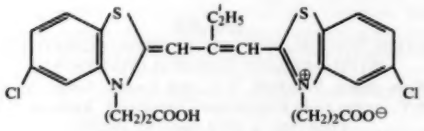
## SILVER HALIDE COLOR PHOTOGRAPHIC MATERIAL

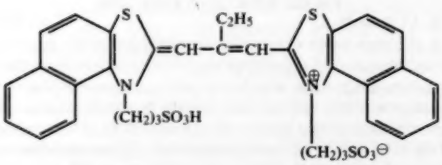
**Takeo Koitabashi; Noboru Fujimori, and Shigemasa Itoh, all of Hino, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Nihonbashi-Muro, Japan**

**Continuation of Ser. No. 670,568, Mar. 25, 1976, abandoned. This application Jan. 10, 1978, Ser. No. 868,461**
**Claims priority, application Japan, Mar. 29, 1975, 50-38426**
**Int. Cl.[2] G03C** *1/76*
**U.S. Cl. 96—74** **9 Claims**

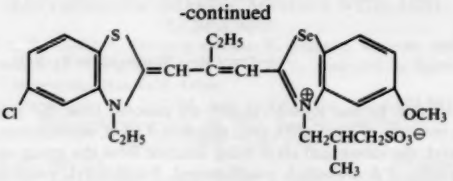
1. In a light-sensitive silver halide color photographic material comprising at least one red-sensitive silver halide emulsion layer sensitized with a red-sensitive dye selected from the group consisting of:

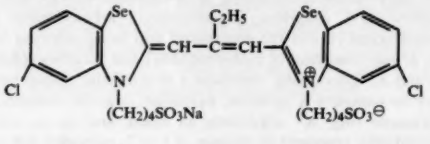


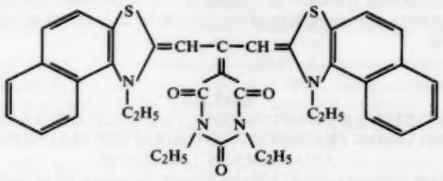


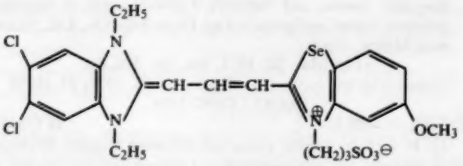


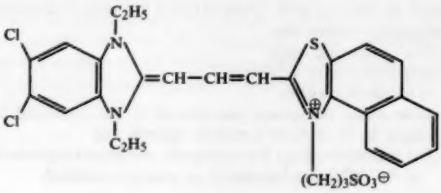
-continued

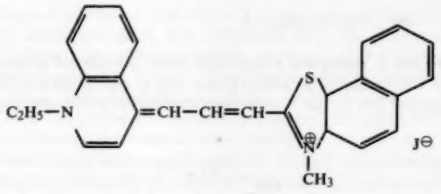




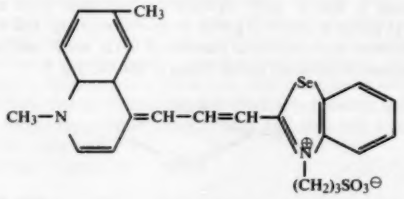




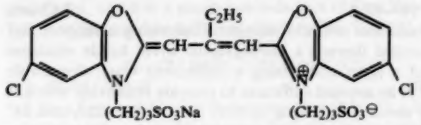


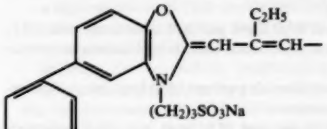


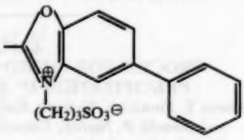
and

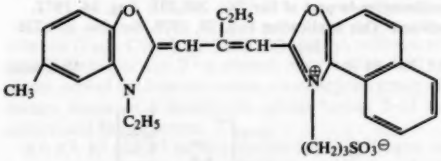


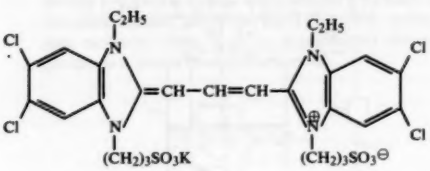
and a green-sensitive silver halide emulsion layer sensitized with a green sensitizing dye, selected from the group consisting of

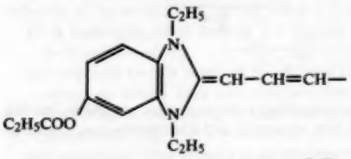


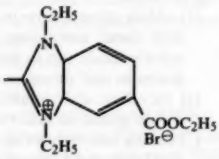


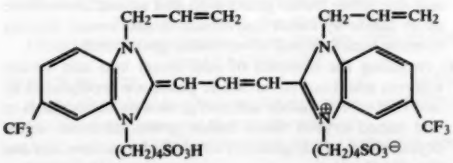




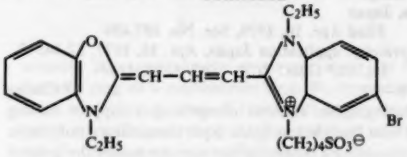


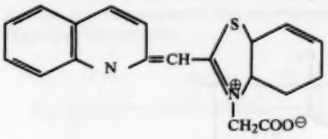


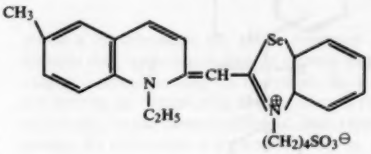


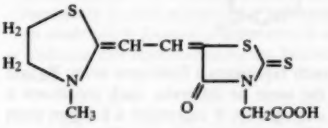


-continued

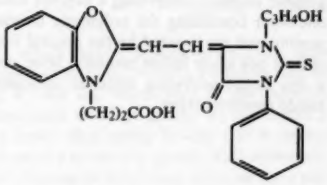




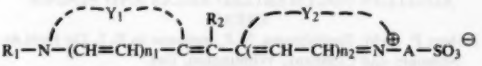




and



the improvement wherein at least one compound of the following general formula



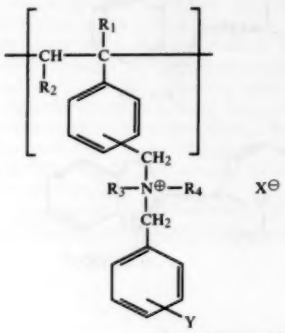
wherein $Y_1$, $Y_2$ each represents non-metallic atoms necessary to complete a nitrogen-containing heterocyclic ring selected from the group consisting of pyrroline, thiazoline, thiazole, benzothiazole, naphthothiazole, selenazole, benzoselenazole, naphthoselenazole, oxazole, benzoxazole, naphthoxazole, imidazole, benzimidazole or pyridine, and $R_1$ represents a lower alkyl group, hydroxyalkyl group, carboxyalkyl group or a sulfoalkyl group, $R_2$ represents a hydrogen atom or a lower alkyl group, A stands for an alkylene group, a group $-(CH_2)_2O(CH_2)_2-$ or a group $-(CH_2)_2OCH_2CHCH_2-$, and $n_2$ represents 0 or 1 is present in either one or both of said red-sensitive silver halide emulsion layer and said green-sensitive silver halide emulsion layer.

## 4,147,548
## PHOTOGRAPHIC ELEMENT COMPRISING QUATERNARY NITROGEN POLYMERIC MORDANT

Yukio Karino, and Taku Nakamura, both of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Apr. 18, 1978, Ser. No. 897,456
Claims priority, application Japan, Apr. 18, 1977, 52-44349
Int. Cl.[2] G03C *7/00, 1/40, 5/54, 1/84*
U.S. Cl. 96—77 7 Claims

1. A photographic element comprising a support having thereon at least one photographic layer containing a polymeric mordant containing a repeating unit represented by the general formula (I):



(I)

wherein $R_1$ and $R_2$ each represents a hydrogen atom; $R_3$ and $R_4$, which may be the same or different, each represents a methyl group or an ethyl group; Y represents a halogen atom or a nitro group; and $X^-$ represents an anion.

7. An integrated type negative image-receiving photographic element comprising a support having thereon at least one layer containing the polymeric mordant containing a repeating unit represented by the general formula (I) of claim 1, at least one silver halide emulsion layer and a layer containing a dye image-providing material associated with said silver halide emulsion layer.

---

## 4,147,549
## LITHOGRAPHIC PRINTING PLATE HAVING ADDITION POLYMERIZED AREAS AND BINDER AREAS

Robert P. Held, Englishtown, N.J., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 614,229, Sep. 17, 1975, abandoned, which is a continuation-in-part of Ser. No. 435,411, Jan. 22, 1974, abandoned. This application Jun. 22, 1977, Ser. No. 808,906
Int. Cl.[2] G03C *1/94, 5/00*
U.S. Cl. 96—85 7 Claims

1. A printing plate having addition polymerized and unpolymerized image areas which comprises a support bearing over its entire surface a layer comprised of a hydrophilic or oleophilic polymeric binder and in the addition polymerized image areas a polymerized ethylenically unsaturated monomer of hydrophilic or oleophilic character opposite that of the polymeric binder, the unpolymerized image areas being substantially free of said ethylenically unsaturated monomer.

## 4,147,550
## PHOTOGRAPHIC SILVER HALIDE ELEMENT WITH A LAYER OF SULFONATED POLYMER

Gerald A. Campbell, Webster, and Richard N. Kelley, Fairport, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jul. 15, 1977, Ser. No. 816,127
Int. Cl.[2] G03C *1/78*
U.S. Cl. 96—87 A 7 Claims

1. A radiation sensitive element comprising a support and having coated thereon a photographic silver halide emulsion layer and a layer comprising a sulfonated water-dispersible polymer in an amount sufficient to provide resistivity which is less than about $10^9$ ohm/sq. at 50% relative humidity and 24° C., said polymer having latex particles less than 1.0 micron in size and comprising:

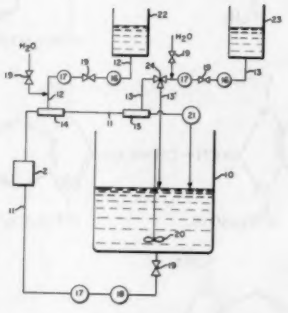
a. about 50 to about 99.9 mole percent of at least one polymerized and then sulfonated monovinyl aromatic monomer;
b. about 0.1 to about 20 mole percent of at least one polymerized polyvinyl monomer; and
c. 0 to about 50 mole percent of at least one other polymerized $\alpha,\beta$-ethylenically unsaturated monomer.

---

## 4,147,551
## PROCESS FOR PHOTOGRAPHIC EMULSION PRECIPITATION IN A RECYCLE STREAM

Loren T. Finnicum, Newark, Del.; Stanley H. Munger, Rumson, and Donald P. Novak, Eatontown, both of N.J., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 280,201, Aug. 14, 1972, abandoned. This application Feb. 28, 1975, Ser. No. 554,226
Int. Cl.[2] G03C *1/02*
U.S. Cl. 96—94 R 10 Claims



1. A process for preparing a photographic emulsion, having a controlled grain size, structure and size distribution, comprising the steps,

(1) adding silver nitrate to a stream, supplied from a conversion vessel, containing gelatin solution and a single first soluble halide salt to initially precipitate first silver halide grains in said stream and form a dispersion,
(2) recycling said stream, containing a dispersion of silver halide grains, to said vessel,
(3) adding one or more aqueous solutions of said first soluble halide salt and a second less soluble halide salt to substitute said first silver halide grains with said second less soluble silver halide by halide conversion in said vessel, thereby forming mixed crystal silver halide grains, and
(4) recycling the contents of said vessel into said stream wherein additional silver halide grains are precipitated by said first soluble halide salt and grown on the surfaces of said mixed crystal silver halide grains, to form mixed crystal silver halide grains of controlled structure, size and size distribution.

4,147,552

## LIGHT-SENSITIVE COMPOSITIONS WITH 3-SUBSTITUTED COUMARIN COMPOUNDS AS SPECTRAL SENSITIZERS

**Donald P. Specht, Spencerport, and Samir Y. Farid, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

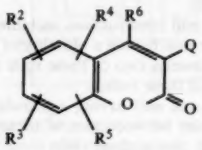
**Continuation-in-part of Ser. No. 688,664, May 21, 1976, abandoned, which is a continuation-in-part of Ser. No. 654,485, Feb. 2, 1976, abandoned. This application Feb. 17, 1977, Ser. No. 769,621**

**Int. Cl.[2] G03C** *1/70, 1/68, 1/71*

**U.S. Cl. 96—115 R** **24 Claims**

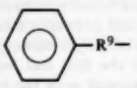
1. In a light-sensitive composition comprising, in admixture, light-sensitive material selected from the group consisting of a light-sensitive simple compound having olefinic unsaturation or an azide group (—$N_3$), or a light-sensitive polymer containing in the backbone or in pendent groups, moieties having olefinic unsaturation of an azide group (-$N_3$), and a sensitizer for said compound or polymer;

the improvement wherein said sensitizer has an absorptive maximum between about 250 and about 550 nm and the formula



wherein Q is —CN or —Z-$R^1$; Z is carbonyl, sulfonyl, sulfinyl or arylenedicarbonyl; $R^1$ is alkenyl; alkyl having 1–12 carbon atoms; aryl of 6–10 carbon atoms; a carbocyclic group of 5–12 carbon atoms or a heteocyclic group having 5–15 nuclear carbon and hetero atoms;

$R^2$, $R^3$, $R^4$ and $R^5$ each independently is hydrogen, alkoxy having 1–6 carbon atoms, dialkylamino with each alkyl of the dialkylamino group having 1–4 carbon atoms, halogen, acyloxy, nitro, a 5- or 6-membered heterocyclic group, or a group having the formula



wherein $R^9$ is an alkylene having from 1–5 carbon atoms;

$R^6$ is hydrogen, alkyl having 1–4 carbon atoms, or aryl of 5–10 carbon atoms;

and wherein two or three of $R^2$ -$R^5$ and the nuclear carbon atoms to which they are attached can together form a fused ring or fused ring system, each ring being a 5- or 6-membered ring;

said sensitizer being present in an amount sufficient to appreciably increase the speed of the composition beyond that which exists without any sensitizer.

---

4,147,553

## SUPERSENSITIZED PHOTOGRAPHIC EMULSION

**Akira Sato; Tadashi Ikeda; Takeo Sakai; Haruo Takei, and Jun Hayashi, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan**

**Filed Feb. 7, 1978, Ser. No. 875,728**

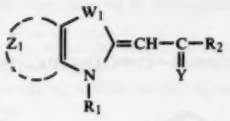
**Claims priority, application Japan, Feb. 10, 1977, 52/13598**

**Int. Cl.[2] G03C** *1/08*

**U.S. Cl. 96—122** **14 Claims**

1. A silver halide photographic emulsion containing, in supersensitizing amounts, the combination of

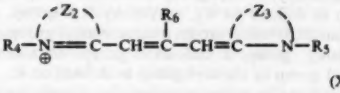
at least one compound represented by the following general formula (I):



(I)

wherein $Z_1$ represents the atoms necessary for forming a benzene ring or a naphthalene ring; $W_1$ represents a sulfur atom or a selenium atom; Y represents an oxygen atom or a sulfur atom; $R_1$ represents an alkyl group or an aryl group; and $R_2$ represents a lower alkyl group having 1 to 6 carbon atoms in the alkyl moiety or an aryl group

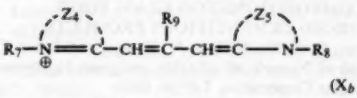
at least one carbocyanine dye represented by the following general formula (II):



(II)

wherein $Z_2$ represents the atoms necessary for forming a thiazole ring, a selenazole ring, an oxazole ring, an imidazole ring or a pyrroline ring; $Z_3$ represents the atoms necessary for forming an oxazole ring or an imidazole ring; $R_4$ and $R_5$, which may be the same or different, each represents an alkyl group; $R_6$ represents a hydrogen atom or a lower alkyl group having 1 to 6 carbon atoms in the alkyl moiety; $X_a^{\ominus}$ represents an acid anion; and p represents 0 or 1 and, when an inner salt is formed, p represents 0; and

at least one dye represented by the following general formula (III):



(III)

wherein $Z_4$ and $Z_5$, which may be the same or different, each represents the atoms necessary for forming a thiazole ring or a selenazole ring; $R_7$ and $R_8$, which may be the same or different, each represents an alkyl group; $R_9$ represents a hydrogen atom, a lower alkyl group having 1 to 6 carbon atoms in the alkyl moiety or an aryl group; $X_b^{\ominus}$ represents an acid anion; and q represents 0 or 1 and, when an inner salt is formed, q represents 0.

---

4,147,554

## DIRECT-POSITIVE PHOTOGRAPHIC SILVER HALIDE EMULSION

**Akira Tanaka; Mamoru Nakatani, and Akio Yoshida, all of Nagaokakyo, Japan, assignors to Mitsubishi Paper Mills, Ltd., Tokyo, Japan**

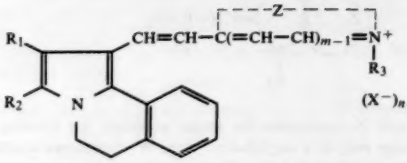
**Filed Mar. 16, 1977, Ser. No. 778,328**

**Claims priority, application Japan, Apr. 2, 1976, 51-36935**

**Int. Cl.[2] G03C** *1/16*

**U.S. Cl. 96—130** **20 Claims**

1. A direct-positive photographic silver halide emulsion comprising fogged silver halide grains which contains at least one sensitizing dye represented by the following general formula:



wherein $R_1$ is an alkyl group of 1–6 carbon atoms, a cycloalkyl group of 3–6 carbon atoms, an aralkenyl group, an aryl group, a furyl group, a pyridyl group, a carboxyl group, an alkoxycarbonyl group of 1–6 carbon atoms, carbamoyl group, or an acyl group, $R_2$ is hydrogen atom or the alkyl, aryl, carboxyl, alkoxycarbonyl, carbamoyl or acyl group as defined on $R_1$, $R_3$ is the alkyl group as defined on $R_1$, a hydroxyalkyl group, an acyloxy group, an alkoxyalkyl group, a carboxyalkyl group, an alkoxycarbonylalkyl group, a sulfoalkyl group, an alkenyl group, an aralkyl group or the aryl group as defined on $R_1$, Z is a group of non-metallic atoms necessary for completing an oxazoline ring, an oxazole ring, a benzoxazole ring, a naphthoxazole ring, a thiazoline ring, a thiazole ring, a benzothiazole ring, a naphthothiazole ring, a selenazole ring, a benzoselenazole ring, a naphthoselenazole ring, a 2-pyridine ring, a 4-pyridine ring, a 2-quinoline ring, a 4-quinoline ring, a 1-isoquinoline ring, a 3-isoquinoline ring, an imidazole ring, a benzimidazole ring, a naphthoimidazole ring, an indolenine ring, an imidazo [4,5-b]-quinoxaline ring, a 2-naphthyridine ring, a 4-naphthyridine ring or a pyrroline ring, $X^-$ is an acid anion and m and n each is 1 or 2.

---

**4,147,555**

## SIZE COMPOSITIONS FOR GLASS FIBER REINFORCED CEMENTITIOUS PRODUCTS

**Eleanor B. Cohen, Granville; William N. Stassen, and James C. Wintgens, both of Newark, all of Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio**

**Filed Apr. 21, 1977, Ser. No. 789,396**
**Int. Cl.[2] C04B *7/02*; C03C *25/02***
**U.S. Cl. 106—99** **4 Claims**

1. A glass fiber strand comprising: a plurality of glass filaments that are coated at forming with an aqueous emulsion of an unplasticized film former comprising a copolymer of from 70 to 80% vinyl acetate and 20 to 30% of an acrylate ester whose ester portion contains an alkyl radical of from 2 to 8 carbon atoms, said film former comprising between 1.4 and 2.5 weight percent of the total dry strand weight, and said coated fibers being drawn together into a strand and dried, and whereby the fibers of the strand are bonded together with a high degree of strand integrity that is preserved when the strand is chopped.

---

**4,147,556**

## NONFLAMMABLE BETA DIKETONATE COMPOSITION

**Harold E. Donley, Oakmont, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.**

**Continuation of Ser. No. 217,222, Jan. 12, 1972, abandoned, which is a continuation-in-part of Ser. No. 16,670, Mar. 5, 1970, Pat. No. 3,660,061, which is a continuation-in-part of Ser. No. 684,131, Nov. 20, 1967, abandoned. This application Jan. 31, 1977, Ser. No. 764,249**
**Int. Cl.[2] C09K *3/00***
**U.S. Cl. 106—287.18** **15 Claims**

1. A composition for producing a metal oxide film on a surface of a heated substrate by contacting the surface, at a temperature sufficient to thermally decompose an organo-metallic coating reactant to metal oxide, with said composition comprising:

a. a beta diketonate of a metal capable of forming an oxide of said metal;

b. a solvent for said beta diketonate which comprises a halocarbon containing from 1 to 4 carbon atoms; and

c. a phenolic compound.

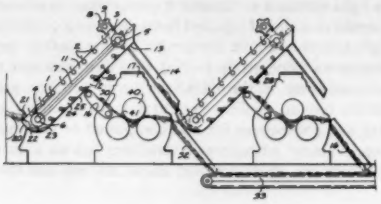
---

**4,147,557**

## METHOD AND APPARATUS FOR FEEDING A SUGAR CANE MILL

**Aryan R. Mayo, 407 E. Del Monte Ave., Clewiston, Fla. 33440**

**Filed Feb. 3, 1978, Ser. No. 874,933**
**Int. Cl.[2] C13D *1/02***
**U.S. Cl. 127—6** **17 Claims**



8. A sugar cane mill construction, including:

a first sugar cane mill having a plurality of driven rolls with a feed inlet between two of these rolls and a feed outlet between two of these rolls;

a second sugar cane mill having a plurality of driven rolls with a feed inlet between two of these rolls and a feed outlet between two of these rolls;

the second sugar cane mill being arranged downstream of the first sugar cane mill;

first and second inclined surface means each extending obliquely forwardly and downwardly to juxtaposition with the feed inlet of the respective of said first and second sugar cane mills, each inclined surface means having an upper, upstream end rearwardly thereof;

first and second conveyor means each for providing an advancing supply of sugar cane stalks, bagasse and juice or bagasse, juice and water, separated into a succession of longitudinally spaced quanta, associated with a respective one of said first and second mills;

chute means for functionally interconnecting the downstream end of the first conveyor means with the upstream end of the second conveyor means;

the upstream end of the first and second inclined surface means being juxtaposed with the respective of said first and second conveyor means for receiving the respective supplies therefrom;

supply splitter means associated with said first conveyor means and being reciprocable between a first condition wherein the quanta of supply provided by the first conveyor means are provided to said first inclined surface means, and a second condition wherein the quanta of supply provided by the first conveyor means are provided to said chute means; and

means for moving said supply splitter means between the first and second conditions thereof.

---

**4,147,558**

## METHOD FOR RINSING AND CHEMICALLY SANITIZING FOOD WARE ITEMS

**Louis F. Fraula, and Stuart E. Athey, both of Troy, Ohio, assignors to Hobart Corporation, Troy, Ohio**

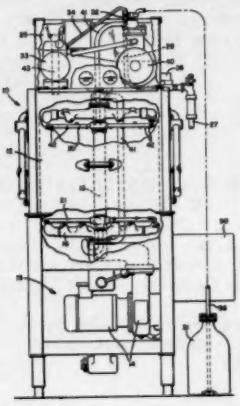
**Filed Sep. 21, 1977, Ser. No. 835,197**
**Int. Cl.[2] B08B *3/02***
**U.S. Cl. 134—10** **17 Claims**

14. A method for rinsing food ware items in a wash chamber within a warewasher having a washing system, such as a dish-washing machine, comprising:

(a) at a location separate from the washing system, preparing

a predetermined quantity of a rinse solution comprising fresh water and a chemical sanitizing agent substantially uniformly distributed therein, by:

(i) mixing a predetermined quantity of the chemical sanitizing agent into a predetermined quantity of the fresh water as the water is drawn from a suitable supply thereof, and



(ii) terminating the supplying of the water after the predetermined quantity of rinse solution has been prepared, and

(b) independently of the fresh water supply, substantially pumping and spraying substantially the entire predetermined quantity of the solution a single time onto the food ware items within the warewasher.

---

**4,147,559**

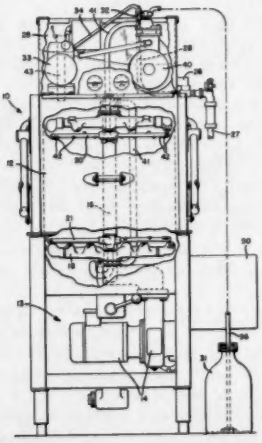
**APPARATUS FOR RINSING AND CHEMICALLY SANITIZING FOOD WARE ITEMS**

**Louis F. Fraula, and Stuart E. Athey, both of Troy, Ohio, assignors to Hobart Corporation, Troy, Ohio**

**Division of Ser. No. 835,197, Sep. 21, 1977. This application Feb. 7, 1978, Ser. No. 875,868**

**Int. Cl.[2] B08B *3/02***

**U.S. Cl. 134—57 D** **12 Claims**



10. In a sanitizing rinse system for a warewasher which includes a spray-type washing system for removing soil from articles to be washed prior to being rinsed, the improvement comprising:

a chamber in which articles to be rinsed are supported for washing and rinsing,

a rinsing spraying system having spray nozzles within said chamber,

a source of fresh water under facility line pressure associated with a main water supply,

a holding tank for receiving a predetermined volume of water from said source,

valve means for connecting and disconnecting said source with said tank for filling said tank,

a sanitizing material supply,

means for dispensing a predetermined quantity of sanitizing material into said tank for dispersion with water to produce a batch of sanitizing solution capable of destroying bacteria when sprayed onto said articles,

pump means interconnecting said tank and spray nozzles to pump said batch of solution under pressure onto said articles to rinse said articles,

first control means for operating said valve means to commence introduction of fresh water into said tank,

second control means for operating said dispensing means to introduce said predetermined quantity of sanitizing material into said tank, and

third control means independent of said first control means for operating said valve means to discontinue water introduction into said tank in response to achieving a predetermined batch of solution therein.

---

**4,147,560**

**SOLAR CELL ARRANGEMENT FOR TERRESTRIAL USE**

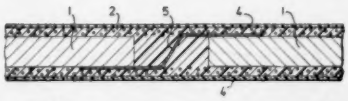
**Hans Gochermann, Holm, Fed. Rep. of Germany, assignor to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt, Fed. Rep. of Germany**

**Filed Mar. 6, 1978, Ser. No. 883,850**

**Claims priority, application Fed. Rep. of Germany, Mar. 5, 1977, 2445642**

**Int. Cl.[2] H01L *31/04***

**U.S. Cl. 136—89 H** **5 Claims**



1. In a solar cell generator for producing electrical energy for terrestrial use including a plurality of interconnected solar cells encased on all sides by a transparent radiation resistant plastic material, the improvement wherein the outer surfaces of the plastic casing are covered by a transparent foil of a weather resistant material which adheres to said plastic material.

---

**4,147,561**

**SOLAR ENERGY COLLECTOR**

**John R. Knight, 10, Milton Rd., Gayton, Northampton, England**

**Filed Sep. 15, 1976, Ser. No. 723,454**

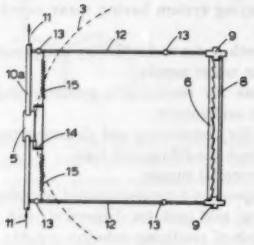
**Claims priority, application United Kingdom, Sep. 25, 1975, 39306/75**

**Int. Cl.[2] F24J *3/02*; H01L *31/00***

**U.S. Cl. 136—206** **16 Claims**

1. A solar energy collector including Fresnel lens substantially fixed in orientation and position relative to the Earth, a mounting mechanism capable of movement relative to the Fresnel lens, a receiver supported by the mounting mechanism, the mounting mechanism moving the receiver about an area defined as the surface of a sphere, which area defines the focal

surface of the Fresnel lens for direct sunlight, and orientation means for continually orientating the receiver so that said




receiver is positioned in a region of high intensity of radiation during the period of direct sunlight.

---

**4,147,562**

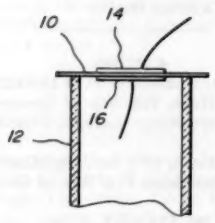
**PYROELECTRIC DETECTOR**

**Alice M. Chiang, Weston, and Neal R. Butler, Acton, both of Mass., assignors to Honeywell Inc., Minneapolis, Minn.**

**Filed Jul. 5, 1977, Ser. No. 813,018**

**Int. Cl.[2] H01L** *35/02*

**U.S. Cl. 136—213** **9 Claims**




1. A pyroelectric device comprising:

an electrically poled body of parylene C polymer; and

means for deriving a pyroelectric response from the body.

---

**4,147,563**

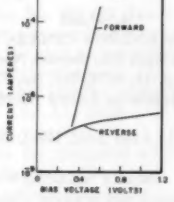
**METHOD FOR FORMING P-N JUNCTIONS AND SOLAR-CELLS BY LASER-BEAM PROCESSING**

**Jagdish Narayan, and Rosa T. Young, both of Knoxville, Tenn., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed Aug. 9, 1978, Ser. No. 932,154**

**Int. Cl.[2] H01L** *21/26, 21/268*

**U.S. Cl. 148—1.5** **9 Claims**




9. A method for producing a solar cell, said method comprising:

(a) depositing on a front face of crystalline silicon wafer a superificial layer of a selected impurity, said layer having a thickness in the range of from about 50 to 100 A;

(b) irradiating said layer with at least one laser pulse having a wavelength in the range of from about 0.3 to 1.1 μm, an energy area density in the range of from about 1.0 to 2.0 J/cm$^2$, and a duration in the range of from about 20 to 60 nanoseconds to effect melting of said layer and the contiguous portion of said body; and

(c) providing the resulting composite with front and back electrically conductive contacts.

---

**4,147,564**

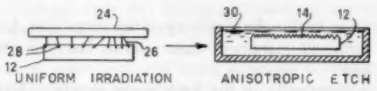
**METHOD OF CONTROLLED SURFACE TEXTURIZATION OF CRYSTALLINE SEMICONDUCTOR MATERIAL**

**Thomas J. Magee, Belmont; Richard R. Pettijohn, Portola Valley; Shelley A. Stewart, Santa Clara, and Malcolm Thackray, Stanford, all of Calif., assignors to SRI International, Menlo Park, Calif.**

**Filed Nov. 18, 1977, Ser. No. 852,786**

**Int. Cl.[2] H01L** *21/306*

**U.S. Cl. 148—1.5** **16 Claims**




1. A method of texturizing the surface of a crystalline semiconductor material, which method comprises,

irradiating the crystalline semiconductor surface to be texturized uniformly with ionizing radiation from a radiation source to form damage tracks therein, and

subjecting the area damaged by the ionizing radiation to an etching fluid for anisotropically etching the same for the texturization thereof.

---

**4,147,565**

**PROCESS FOR THE APPLICATION OF A REFLECTING COATING ON A METALLIC SURFACE**

**Olivier Puyplat, Paris, France, assignor to Societe Industrielle de Mecanique, Lyons, France**

**Filed Sep. 14, 1977, Ser. No. 833,123**

**Claims priority, application France, Sep. 30, 1976, 76 29355**

**Int. Cl.[2] B05D** *1/06, 1/24, 1/38, 3/02*

**U.S. Cl. 148—6.15 R** **15 Claims**

1. In a process for the application of a reflecting coating on a metallic surface such as sheet metal, the combination of the following successive steps of:

(a) applying on the unpolished metallic surface a layer of a pulverulent dressing intended to reduce the roughness of said surface,

(b) subjecting said layer of pulverulent dressing to a heat treatment with a view to fixing said latter on the metallic surface and of creating a surface having large amplitude and shallow-depth undulations coexisting with micro-fissures and other small defects,

(c) smoothing the layer thus fixed by the deposit of a layer of varnish intended to fill in the micro-fissures and other small defects, whilst conserving said undulations, and

(d) then subjecting the surface thus obtained to a conventional metallization operation.

4,147,566

## CROSS BLEND OR SOLVENT TYPE RUST CONVERTING PAINT

Clarence E. Leonard, 20405 Martin Rd., St. Clair Shores, Mich. 48081

Filed Sep. 29, 1977, Ser. No. 837,945
Int. Cl.[2] C23F 7/10
U.S. Cl. 148—6.15 R 11 Claims

1. A cross blend rust converting paint consisting essentially of, in percent by weight:
(a) organic solvent soluble resins, about 1% to about 99%, on a solids basis,
(b) primary water soluble alcohols, about ¼% to about 85%,
(c) phosphoric acid, about ¼% to about 50%,
(d) water based resins, about 0.2% to about 99%, on a solids basis.

---

4,147,567

## PHOSPHATING PROCESS

Michael Brock, Reading, and Brian A. Cooke, Knotty Green, both of England, assignors to Imperial Chemical Industries Limited, London, England

Filed Nov. 21, 1977, Ser. No. 853,814
Claims priority, application United Kingdom, Nov. 24, 1976, 48957/76
Int. Cl.[2] C23F 7/10, 7/12, 7/14
U.S. Cl. 148—6.15 Z 3 Claims

1. A process of applying a phosphate coating to a metal substrate comprising iron, zinc or aluminum by treating the substrate with an acidic zinc phosphate solution which contains 1 to 100 parts per million parts of solution of a water-soluble sodium, potassium or ammonium salt of a lignosulphonate.

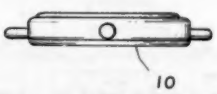
---

4,147,568

## COPPER-ZINC-NICKEL-MANGANESE ALLOYS

Pierre Marechal, Waldenburg, Switzerland, assignor to Institut Straumann AG, Switzerland

Filed Jul. 15, 1977, Ser. No. 816,175
Claims priority, application Switzerland, Jul. 15, 1976, 9081/76
Int. Cl.[2] C22C 9/04
U.S. Cl. 148—32.5 15 Claims



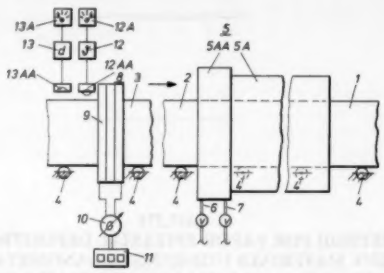

1. A tetragonal age-hardened copper-zinc-nickel manganese alloy consisting essentially of
36 to 44% copper,
21 to 28% in toto of zinc with or without tin and/or indium, provided that tin and/or indium if present amount together to at most 10%,
18 to 25% in toto of nickel with or without cobalt, provided that cobalt if present amounts to at most 5%,
10 to 18% managese,
up to 0.5% of at least one of beryllium and the rare-earth metals, provided that neither the beryllium content nor the rare-earth metal content exceeds 0.3%,
additives from the group lithium, magnesium, calcium and titanium, serving as de-oxidizing elements, and iron as the usual impurity.

4,147,569

## METHOD OF HEATING OF AT LEAST TWO ELONGATED TUBULAR METALLIC OBJECTS

Friedhelm Reinke, Remscheid; Friedhelm Emde, Hückeswagen; Herbert Geisel, Remscheid-Lüttringhausen; Rolf Gies, Remscheid; Friedrich Müller-Axt, Dusseldorf-Angermund; Klaus Lange, Duisburg, and Manfred Schoenen, Mettmann, all of Fed. Rep. of Germany, assignors to AEG-Elotherm, GmbH, Remscheid-Hasten, Fed. Rep. of Germany

Filed Jan. 10, 1977, Ser. No. 758,337
Claims priority, application Fed. Rep. of Germany, Jan. 9, 1976, 2600626
Int. Cl.[2] C21D 9/14
U.S. Cl. 148—128 2 Claims




1. A process for heating at least two metal pipes of finite length comprising the steps of:
determining the temperature of said pipes;
determining the thickness of the walls of said pipes;
pre-heating each of said pipes in a continuous pass through process in a manner responsive to said temperature determining step and said thickness determining step so as to equalize the variable heating requirements of each of said pipes so that at the end of said process each of said pipes has substantially the same temperature; and
uniformly heating said pipes after said pre-heating step so that said pipes sequentially pass through the heating route with no more than a small distance between them in the longitudinal direction and at an equal speed of conveyance in such a way that said heating step will heat at least partial lengths of two immediate successive pipes simultaneously.

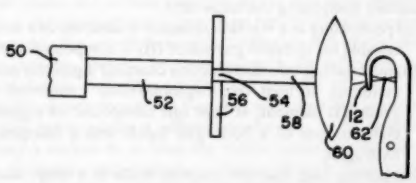
---

4,147,570

## METHOD OF MAKING TEXTILE ELEMENT

Kenneth P. Corbo; Richard W. Shepard, both of Torrington; William A. Ross, New Hartford, and Albert S. Ashmead, Torrington, all of Conn., assignors to The Torrington Company, Torrington, Conn.

Division of Ser. No. 727,446, Sep. 28, 1976, abandoned. This application May 5, 1977, Ser. No. 793,783
Int. Cl.[2] C21D 1/06
U.S. Cl. 148—144 3 Claims




1. A method of making a textile element comprising: applying a laser beam to a selected portion of a member which has been hardened and tempered to provide the proper spring

characteristic for a textile element to provide long fatigue life, the intensity and time and area of application of the laser beam being carefully controlled to provide a small area of full hardness harder than and completely separated from the hardened and tempered major portion by a stress-relieving buffer zone of less hardness than either the tempered major portion or the full hardness area.

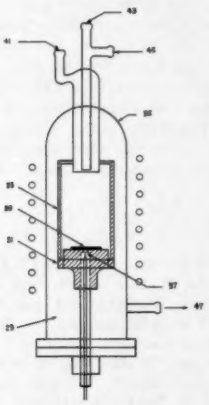
---

**4,147,571**

## METHOD FOR VAPOR EPITAXIAL DEPOSITION OF III/V MATERIALS UTILIZING ORGANOMETALLIC COMPOUNDS AND A HALOGEN OR HALIDE IN A HOT WALL SYSTEM

**Gerald B. Stringfellow, and Howard T. Hall, Jr., both of Palo Alto, Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Jul. 11, 1977, Ser. No. 814,247**
**Int. Cl.² H01L *21/205, 21/322***
**U.S. Cl. 148—175** **28 Claims**



1. A process for the preparation of III/V semiconductor materials comprising the steps of:

(a) positioning in a reaction chamber a substrate of a material suitable for epitaxial growth of III/V compounds thereon;

(b) introducing into said reaction chamber a gaseous mixture including at least one organometallic compound of a group III element, at least one compound of a group V element, one of a hydrogen halide and a halogen, and hydrogen;

(c) heating said reaction chamber walls to a temperature in the range 750° C. to 1000° C., and heating said substrate to a temperature in the range 650° C. to 850° C.; and

(d) depositing on said substrate an epitaxial layer of a III/V compound of said group III and group V elements.

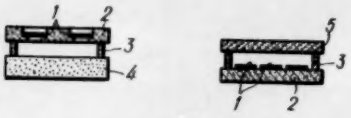
---

**4,147,572**

## METHOD FOR EPITAXIAL PRODUCTION OF SEMICONDUCTOR SILICON CARBIDE UTILIZING A CLOSE-SPACE SUBLIMATION DEPOSITION TECHNIQUE

**Jury A. Vodakov, prospekt Engelsa, 69/1, kv. 35, and Evgeny N. Mokhov, prospekt Energetikov, 54, korpus 2, kv. 59, both of Leningrad, U.S.S.R.**

**Continuation of Ser. No. 733,196, Oct. 18, 1976, abandoned, which is a continuation of Ser. No. 636,444, Dec. 1, 1975, abandoned, which is a continuation of Ser. No. 542,196, Jan. 20, 1975, abandoned, which is a continuation of Ser. No. 446,541, Feb. 27, 1974, abandoned. This application Feb. 27, 1978, Ser. No. 881,714**
**Int. Cl.² H01L *21/203, 21/36***
**U.S. Cl. 148—175** **3 Claims**



1. In a method of epitaxially producing semiconductor silicon carbide comprising the steps of: subliming solid silicon carbide to produce silicon carbide vapors and depositing the vapors on seed crystals of silicon carbide, the improvement comprising performing the steps of sublimation and deposition in an inert medium at a temperature of from 1600°–2400° C. and a pressure of from one atmosphere to $10^{-3}$ mm Hg. and arranging the solid silicon carbide and the seed crystals in a parallel relationship at a distance not exceeding 0.2 of the maximum linear dimension of the solid silicon carbide measured in the direction perpendicular to the distance separating the solid silicon carbide and the seed crystals.

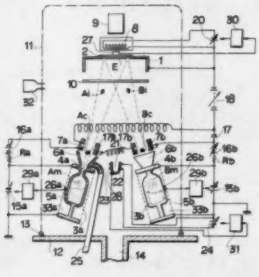
---

**4,147,573**

## METHOD OF DEPOSITING III–V COMPOUNDS ON GROUP IV ELEMENT WAFERS BY THE CLUSTER ION TECHNIQUE

**Kiyoshi Morimoto, Mobara, Japan, assignor to Futaba Denshi Kogyo K. K., Chiba, Japan**

**Filed Mar. 15, 1978, Ser. No. 886,893**
**Claims priority, application Japan, Apr. 5, 1977, 52-38039**
**Int. Cl.² H01L *21/203, 21/26;* C23C *15/00***
**U.S. Cl. 148—175** **3 Claims**



1. A method of producing a compound semiconductor wafer which comprises cleaning the surface of a monocrystalline substrate of a group-IV element semiconductor by inert-gas ion beam etching, said substrate being held in a high vacuum atmosphere, separately evaporating vaporizing-materials consisting of or containing the component elements of a desired III–V compound semiconductor to produce vapors of said component elements, jetting said vapors into said high vacuum region to form clusters of said component elements, ionizing

said clusters to form cluster ions, and giving kinetic energy to said cluster ions by an electricfield to make them impinge on the surface of said substrate so that an epitaxial layer of said desired compound semiconductor is formed on the surface of said substrate.

---

**4,147,574**

## SUEDE-LIKE SHEET MATERIALS AND METHOD OF PRODUCING THE SAME

**Takashi Setsuie; Koji Mimura, both of Otake, and Kiyonobu Okamura, Hiroshima, all of Japan, assignors to Mitsubishi Rayon Company, Limited, Tokyo, Japan**

**Filed Jul. 6, 1977, Ser. No. 813,354**
**Claims priority, application Japan, Jul. 12, 1976, 51-82660**
**Int. Cl.² B32B *17/00***
**U.S. Cl. 156—62.4** **27 Claims**

27. A method of producing a suede-like sheet material, which comprises: forming a composite layer by depositing a web of compound fibers which are easily divisible into ultrafine fibers of less than 0.5 denier per filament on a base cloth formed of polyester fibers having both a latent spontaneous elongatability and a latent shrinkage of more than 10%; expelling a fine liquid jet stream under high pressure onto the surface of the compound fiber web thereby substantially integrating said compound fibers with said base cloth; shrinking the composite layer; spontaneously elongating said shrunken layer; impregnating said elongated layer with an elastic polymer in an amount less than 50% based on the total weight of the base cloth and compound fibers; and dividing the compound fibers simultaneously with or separately from the integrating treatment or shrinking treatment.

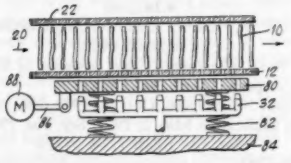
---

**4,147,575**

## MANUFACTURE OF NONWOVEN PILE ARTICLES

**Walter Hurtes, 433 W. 34th St., New York, N.Y. 10001**

**Continuation of Ser. No. 527,084, Nov. 25, 1974, abandoned, which is a continuation-in-part of Ser. No. 331,658, Feb. 12, 1973, Pat. No. 3,850,713. This application Sep. 16, 1977, Ser. No. 833,996**
**Int. Cl.² D05C *15/00***
**U.S. Cl. 156—72** **8 Claims**




1. In procedure for making a nonwoven pile article, the steps of

(a) assembling an array of substantially axially aligned cut pile fibers having first and second free ends with the first free ends disposed substantially in a common plane;

(b) passing a directional flow of steam through said array in a direction substantially parallel to the axes of said fibers while

(c) supporting said fibers on a first surface in a free-standing condition in which the fibers are laterally displaceable relative to each other in maintained substantially axial alignment and while

(d) restraining said fibers against substantial axial displacement by maintaining a second surface in spaced parallel relation to said first surface with the fibers of said array extending between said first and second surfaces, at least one of said surfaces being pervious to steam,

(e) said flow of steam being passed through said one pervious surface toward the other of said surfaces with sufficient force for effecting lateral displacement of the fibers relative to each other;

(f) heating said surfaces and said array before passing said flow of steam therethrough for preventing condensation of moisture thereon from the flow of steam;

(g) mechanically agitating said first surface while said flow of steam is being passed through said array, by vibrating the first surface, for laterally displacing the fibers of the array relative to each other in maintained substantially axial alignment in such manner as to achieve a uniform pile density in the array while the fibers are being exposed to steam; and

(h) thereafter applying an adherent backing to said first free ends to form a pile article in which said array constitutes the pile.

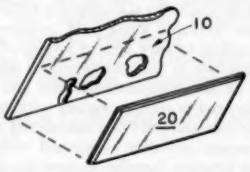
---

**4,147,576**

## METHOD OF REPAIRING A VEHICLE BODY

**Lewis W. Beem, 15856 Riley, and Leo D. Beem, 1632 Lakewood Blvd., both of Holland, Mich. 49423**

**Filed Mar. 2, 1977, Ser. No. 773,610**
**Int. Cl.² B29H *19/00***
**U.S. Cl. 156—94** **4 Claims**

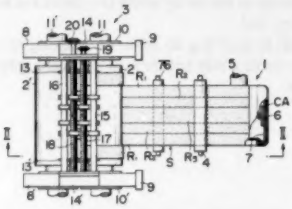



1. A method for repairing an area of a vehicle body comprising: providing a thin sheet of stock plastic of sufficient size to cover the area to be repaired, said plastic sheet has a thickness of from about 20 mils to about 40 mils, said plastic sheet being sufficiently pliable that it can be manually shaped to conform generally to the area to be repaired, but sufficiently rigid to resist oil canning, denting and other localized deformation; cutting and shaping said plastic sheet to a size that it extends between ornamental deviations in the otherwise smooth surface of the vehicle being repaired whereby the edges of said plastic sheet are not as readily apparent to view; preparing the area of the vehicle to be repaired by making sure it is reasonably smooth and free of excessive flaking rust; manually shaping said plastic to conform generally to the area to be repaired; beveling the edges of said plastic sheet before said plastic sheet is adhered to the area to be repaired; adhering said plastic sheet to the vehicle area to be repaired with an adhesive; said method further including sanding the beveled edges of said plastic sheet to further effect blending with the vehicle surface after said plastic sheet is adhered to the area to be repaired; applying a sealant to at least the visible edges of said plastic sheet, feathering said sealant to create a smooth flowing surface from the surface of said plastic sheet to the surface of the vehicle, said sealant being of a material which dries firm, but resilient whereby cracking is minimized; painting the repaired area of the vehicle.

## 4,147,577
## PNEUMATIC TIRE BUILDING METHOD AND APPARATUS

Norio Kobayashi, and Yoshihiro Fukamachi, both of Kodaira, Japan, assignors to Bridgestone Tire Company Limited, Tokyo, Japan

Filed Jul. 21, 1977, Ser. No. 817,850
Claims priority, application Japan, Jul. 23, 1976, 51/87851
Int. Cl.[2] B29H *17/37*
U.S. Cl. 156—123 R 3 Claims



1. A pneumatic tire building apparatus comprising:
a tire building drum receiving and holding an endless tire carcass;
a calendering mechanism positioned in spaced relation with said tire building drum, said calendering mechanism including a pair of calender rollers positioned in opposing and spaced relation with each other and each having a rotational axis parallel to that of said tire building drum; at least one compartment plate vertically disposed on and between said calender rollers in perpendicular relation with said rotational axes of said calender rollers and having a lower edge contoured in sliding contact with said calender rollers to partition different unvulcanized rubber materials on said calender rollers and to enable a continuous rubber strip consisting of said different rubber materials to be calendered by said calender rollers, said compartment plate movable along said rotational axes of said calender rollers to vary desired widths of said calendered rubber materials, at least one separator relatively movably mounted on said compartment plate and having a lower edge contoured in sliding contact with said calender rollers to separate and joint said calendered rubber materials, driving means drivably connected with said calender rollers for rotation therefor, compartment moving means for moving said compartment plate along said rotational axes of said calender rollers, and separator moving means for moving said separator to separate and joint said calendered rubber materials; and
a cutting mechanism disposed between said tire building drum and said calendering mechanism to be movable along said rotational axes of said calender rollers for cutting said calendered rubber materials to have their desired widths.

## 4,147,578
## METHOD OF MAKING ACOUSTICAL LAMINATE

Muriel L. Koss, Arlington, Calif., assignor to Rohr Industries, Incorporated, Chula Vista, Calif.

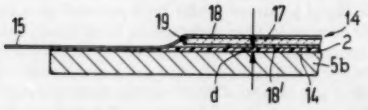
Division of Ser. No. 672,353, Mar. 31, 1976, Pat. No. 4,091,160.
This application Dec. 1, 1977, Ser. No. 856,261
Int. Cl.[2] E04B *1/74*
U.S. Cl. 156—245 5 Claims

1. The method of fabricating an acoustic panel which comprises the steps of:
providing at least two sheets of prepreg material comprising an open weave glass fiber fabric impregnated with about 13 to 32 weight percent epoxy resin advanced to the B-stage, based on glass fabric weight;
placing said at least two sheets on a mold surface having a selected configuration;
placing a bleeder pack over said at least two sheets;
completing cure of said resin at a temperature of from about 150 to 300° F. at a pressure of from about 5 to 100 psi, whereby an acoustic laminate having an airflow resistance of about 2 to 60 rayls at an airflow velocity of about 17 cm/sec. results; and
bonding said acoustic laminate to the face of a honeycomb core sheet having an impervious backing to produce an acoustic panel.

## 4,147,579
## METHOD OF PRODUCING AN ELECTRIC COMPONENT CONSISTING OF ELEMENTS JOINED BY AN INSULATING CO-POLYMER LAYER

Reinhart Schade, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Jun. 22, 1976, Ser. No. 698,786
Claims priority, application Fed. Rep. of Germany, Jul. 17, 1975, 2532009
Int. Cl.[2] B32B *31/18, 31/20*
U.S. Cl. 156—252 1 Claim

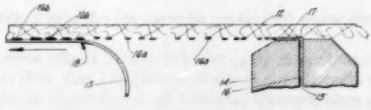


1. A process for producing an electric component part having at least two elements joined to one another by an insulating copolymer layer, comprising:
stamp-punching a first element from a metal sheet having an insulating copolymer on at least one side thereof;
heating said first element with said copolymer layer thereon to a softening temperature of said copolymer; and
pressing a second element onto the so-heated copolymer layer on the first element while substantially simultaneously embedding electrically-conductive wires connected to the second element into said heated copolymer layer.

## 4,147,580
## METHOD OF BONDING A POROUS FIBROUS WEB TO A SUBSTRATE

Kenneth B. Buell, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Division of Ser. No. 627,406, Oct. 30, 1975, Pat. No. 4,069,822.
This application May 2, 1977, Ser. No. 792,523
Int. Cl.[2] B32B *7/14, 31/10*
U.S. Cl. 156—291 14 Claims



1. A process of continuously manufacturing integral disposable diapers of the type comprising a fluid-porous, fibrous topsheet, a fluid impermeable, non-fibrous backsheet and an absorbent core element therebetween, said process comprising the steps of providing a continuous web of fluid-porous, fibrous topsheet material and a continuous web of fluid-impermeable, non-fibrous backsheet material, providing a controlled thickness hot-melt adhesive source, causing said topsheet web to pass over said hot-melt adhesive source with some at least of the individual fibers and fiber junctions defining that surface of said top sheet web adjacent said hot-melt adhesive source wiping hot-melt adhesive from said source thereof to form randomly disposed adhesive globules on said

last mentioned individual fibers and fiber junctions, providing a pair of preset clearance nip rolls, continuously passing said topsheet web and said backsheet web between said rolls with said surface of said topsheet web facing said backsheet web, continuously introducing core elements one after another in spaced relationship between said topsheet web and said backsheet web upstream of said rolls, providing a preset clearance nip gap between said rolls so sized as to deform said adhesive globules on that portion of said topsheet web adjacent said backsheet web to bond said top and back sheet webs directly together while minimizing press-through of said adhesive through said topsheet web and severing said bonded topsheet and backsheet webs to form said integral disposable diapers.

---

**4,147,581**

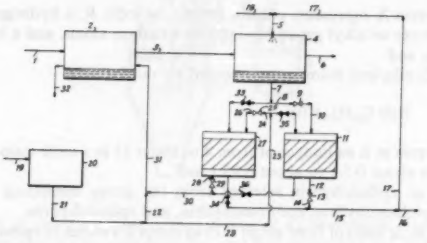
## ETCHING OF METAL

**Warren A. Nelson, Hohokus, N.J., assignor to Philip A. Hunt Chemical Corp., Palisades Park, N.J.**

**Division of Ser. No. 671,310, Mar. 29, 1976, Pat. No. 4,060,447. This application Sep. 14, 1977, Ser. No. 833,011**

**Int. Cl.[2] C23F** *1/08, 1/02*

**U.S. Cl. 156—345** **2 Claims**



1. An etching apparatus for dissolving a material as cations from a surface of a body which comprises an etcher, means to pass said body into said etcher, means to contact said body within said etcher with an etching solution containing dissolved cations of said material, a rinser, means to pass said body from said etcher into said rinser, means to contact said body within said rinser with a rinsing liquid, whereby residual etching solution containing cations of said material is washed from said body and diluted by said liquid, a cation exchange means, means to pass said rinsing liquid leaving said rinser into said cation exchange means to remove the cations from the rinsing liquid and leave them in the cation exchange means whereby said cation exchange means becomes laden with cations of said material derived from said rinsing liquid, means to pass a replenishing solution stream through said cation laden exchange means, said replenishing solution stream containing a lesser concentration of such cations than said etching solution, whereby cations of said material are removed from said cation exchange means and introduced into said replenishing solution stream, means to pass the resulting replenishing solution stream containing such cations into said etcher, and means to remove etching solution rich with dissolved cations of such material from said etcher.

---

**4,147,582**

## APPARATUS FOR PRODUCING INSULATING PANELS

**Giuseppe Brollo, Piazza Achille Grandi, Solaro (Milano-Italia), Italy**

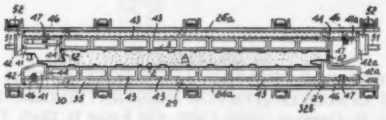
**Filed Jun. 13, 1977, Ser. No. 805,953**

**Claims priority, application Italy, Sep. 9, 1976, 27823 A/76**

**Int. Cl.[2] B30B** *5/06, 15/02*

**U.S. Cl. 156—462** **10 Claims**

1. An apparatus for the continuous production of prefabricated insulating panels, comprising: a feeding station for a lower metal sheet and for an upper metal sheet; a rolling-mill train for shaping said sheets; a furnace for heating said sheets; a device for injecting expandable plastic material between said sheets; a joining unit for joining the sheets together and for holding the expanded plastic material in place, said joining unit having two link-type upper and lower conveyors for the sheets shaped by the rollingmills, at least one of said conveyors being adjustable so that the distance between them may be regulated according to the thickness of the panel, said conveyors being arranged to revolve continuously around rollers which rotate about horizontal axes, each link of said link-type conveyors including a transversely-extending, dove-tail-shaped, hollow coupling section mounted lengthwise on each adjacent link,



and said joining unit also having holding sections on said conveyors for acting on the shaped surfaces of the sheets, said holding sections comprising a series of detachable blocks for the formation of trains having a shape which mates with the sheets, said joining unit also including two chain-mounted pressure units arranged to be continuously driven by rollers revolving around vertical axes and including support sections for pushing laterally against the panels; a support plate engageable in mating relationship with said dove-tail section on which plate said series of detachable blocks are receivable; and a cutter for cutting the finished panel.

---

**4,147,583**

## APPARATUS FOR SEALING AND CUTTING FILLED WRAPPERS

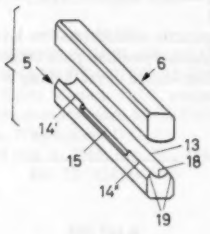
**Gert Deutschländer, Neuhausen am Rheinfall, Switzerland, assignor to SIG Schweizerische Industrie-Gesellschaft, Neuhausen am Rheinfall, Switzerland**

**Filed Mar. 9, 1978, Ser. No. 885,071**

**Claims priority, application Switzerland, Mar. 11, 1977, 3125/77**

**Int. Cl.[2] B32B** *31/00;* **B65B** *61/18;* **B26D** *1/12*

**U.S. Cl. 156—510** **5 Claims**



1. In an apparatus for sealing and cutting a hose-like wrapper, having serially arranged filled pockets and zones therebetween, including oppositely rotating, cooperating clamping shoes between which the wrapper passes for pressing together and transversely sealing opposite wrapper walls in said zones by providing a seam therein; a knife secured to one of the clamping shoes and a backup support secured to the other clamping shoe; a first cutting edge forming part of the knife and cooperating with the backup support for transversely separating wrapper packages from one another by providing a severing cut in each said zone, the improvement wherein said knife comprising

(a) a groove extending in a length dimension of said knife and having parallel-spaced outer first and second groove edges; and

(b) external inclined faces extending in said length dimension

on either side of said groove and converging towards one another in the direction of said groove; said inclined faces terminating on respective said first and second groove edges; said first cutting edge being constituted by said first groove edge and at least one second cutting edge being constituted by said second groove edge; said at least one second cutting edge providing a cut in each said zone adjacent the severing cut to facilitate a manual tearing-open of said seams.

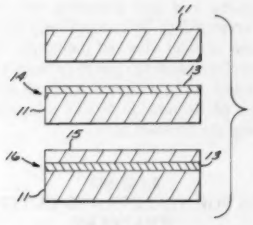
---

**4,147,584**

## METHOD FOR PROVIDING LOW COST WAFERS FOR USE AS SUBSTRATES FOR INTEGRATED CIRCUITS

**Lilburn H. Garrison, Vista, Calif., and Anant D. Dixit, Capilla Court, India, assignors to Burroughs Corporation, San Diego, Calif.**

**Filed Dec. 27, 1977, Ser. No. 864,382**
**Int. Cl.[2] H01L** *21/203, 21/205*
**U.S. Cl. 156—612** **7 Claims**




1. A method for manufacturing wafers for use as substrates for integrated circuits, which wafers have a minimum of crystal defects, said method comprising:

depositing a polycrystalline layer of pure sapphire upon a crystalline body having <111> orientation;

annealing the polycrystalline layer of pure sapphire sufficiently to form a monocrystalline layer of pure sapphire, said monocrystalline sapphire layer having <1101> orientation; and

depositing an epitactic monocrystalline layer of silicon upon the layer of monocrystalline pure sapphire, said epitactic monocrystalline silicon layer having a <111> orientation.

---

**4,147,585**

## PROCESS FOR SURFACE-SIZING PAPERS WITH MALEIC ANHYDRIDE COPOLYMERS

**Rosemarie Töpfl, Dornach, Switzerland, assignor to Ciba-Geigy AG, Basel, Switzerland**

**Filed Oct. 19, 1977, Ser. No. 843,475**
**Claims priority, application Switzerland, Nov. 1, 1976, 13743/76**
**Int. Cl.[2] D21D** *3/00*
**U.S. Cl. 162—135** **10 Claims**

1. A process for surface-sizing a paper with a maleic anhydride copolymer, wherein the paper is impregnated with a water-soluble salt of a copolymer of (a) 40 to 50 mol % of maleic anhydride and/or maleic acid, (b) 50 to 40 mol % of styrene and (c) 5 to 15 mol % of a vinyl alkyl ether having 3 to 8 carbon atoms in the alkyl radical, which has been reacted with (d) 0.15 to 0.30 mol per mol of component (a) of a primary fatty amine having 12 to 22 carbon atoms, and dried.

**4,147,586**

## CELLULOSIC PAPER CONTAINING THE REACTION PRODUCT OF A DIHALOALKANE ALKYLENE DIAMINE ADDUCT AND EPIHALOHYDRIN

**John P. Petrovich, Chesterfield, and David L. Taylor, St. Louis, both of Mo., assignors to Monsanto Company, St. Louis, Mo.**

**Continuation-in-part of Ser. No. 506,678, Sep. 14, 1974, abandoned, which is a continuation of Ser. No. 318,819, Dec. 27, 1972, abandoned. This application Jan. 9, 1978, Ser. No. 868,103**
**The portion of the term of this patent subsequent to Dec. 17, 1991, has been disclaimed.**
**Int. Cl.[2] D21H** *3/42*
**U.S. Cl. 162—135** **8 Claims**

1. A cellulosic paper having improved wet strength which comprises a cellulosic paper and a sufficient amount of thermosetting cationic resinous composition to impart wet strength, said resinous composition comprising the reaction product of (A) an adduct of

(1) a dihaloalkane represented by the formula

$$X-CH_2(CH_2)_n-\underset{\displaystyle R}{\underset{|}{C}}H_2-X$$

wherein X represents chloro, bromo, or iodo, R is hydrogen, hydroxy or alkyl group having 1 to 4 carbon atoms, and n is 0 or 1, and

(2) alkylene diamine represented by the formula

$$H_2N\ C_mH_{2m}NH_2$$

wherein m is an integer of from 4 to about 15 in a mole ratio of from about 0.5:1 to about 0.95:1 and

(B) an epihalohydrin selected from the group consisting of epichlorohydrin, epibromohydrin, and epiiodohydrin,

in a mole ratio of from about 1.25 to about 2.5 moles of epihalohydrin per mole of amine group in said adduct, and said resinous composition having been cured to a water insoluble state after application to said cellulosic paper.

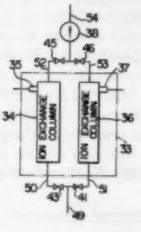
---

**4,147,587**

## METHOD FOR DETECTING THE FAILURE OF NUCLEAR FUEL ELEMENTS

**Motoaki Utamura, Kitaibaraki, and Shunsuke Uchida, Hitachi, both of Japan, assignors to Hitachi, Ltd., Japan**

**Filed Mar. 1, 1977, Ser. No. 773,172**
**Claims priority, application Japan, Mar. 3, 1976, 52/22187**
**Int. Cl.[2] G21C** *17/00*
**U.S. Cl. 176—19 LD** **25 Claims**




14. A method for detecting the failure of nuclear fuel elements, comprising the steps of:

closing an upper end portion of each of nuclear fuel assemblies located in reactor coolant and in a core of a nuclear reactor to block the passage of the reactor coolant through each nuclear fuel assembly;

heating a portion of coolant in a nuclear power plant, outside each said nuclear fuel assembly, to a temperature level higher than the temperature level of the reactor coolant originally existing in each said nuclear fuel assembly;

feeding the heated coolant to each said nuclear fuel assembly;
allowing the nuclear fuel assembly to stand as it is for a predetermined time interval after feeding of the heated coolant is stopped;
sampling the heated coolant; and
measuring the radioactivity of a sample of the coolant obtained in the sampling step.

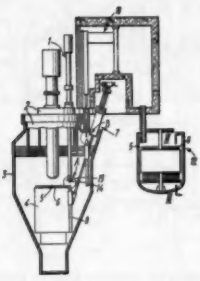
---

**4,147,588**

## FAST REACTOR RECHARGING DEVICE

**Lev N. Artemiev, ulitsa Berezdvskaya, 89, kv. 94, and Vitaly V. Kurilkin, ulista Shalyapina, 15, kv. 14, both of Gorky, U.S.S.R.**

**Filed May 13, 1977, Ser. No. 796,602**
**Int. Cl.[2] G21C *19/20*; B66C *17/08***
**U.S. Cl. 176—30** **2 Claims**



1. A device for recharging a core of a fast-neutron reactor, comprising a storage drum for new fuel assemblies and rods of a control and safety system; a storage drum for spent fuel assemblies and rods of the control and safety system, said storage drums having identical compartments for fuel assemblies and rods of the control and safety system; a recharging mechanism for placing new fuel assemblies and rods of the control and safety system in the core of said reactor and for removing spent fuel assemblies and rods therefrom, said recharging mechanism having a grip adapted to interact with heads of said fuel assemblies and rods by gripping the heads on the outside; a mechanism for transferring said fuel assemblies and rods from said storage drums to the recharging mechanism and vice versa; a set of sleeve-type holders having one end open for receiving said rods of the control and safety system, so that when placed in such a holder, the dimensions of the combination of the holder and the rod of the control and safety system are equal to those of a fuel assembly; a collet mounted on the open end of each of said sleeve-type holders; each of the rods having a profiled head and an encircling groove provided on a surface of each of said rods of the control and safety system, near its profiled head, for joining said rod with said holder by means of said collet which interacts with said groove; said grip having a stop adapted to interact with said collet to unclamp the latter from said rod; and spring means arranged in said holder for pressing against the rod in an axial direction in order to remove said rod from said holder.

---

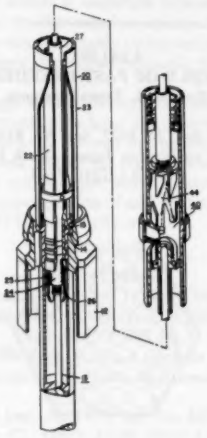
**4,147,589**

## CONTROL ROD FOR A NUCLEAR REACTOR

**Walter G. Roman, and Harry G. Sutton, Jr., both of Pittsburgh, Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Continuation of Ser. No. 443,885, Feb. 19, 1974, Published Application No. T942,002. This application Jul. 19, 1976, Ser. No. 706,356**
**Int. Cl.[2] G21C *7/08***
**U.S. Cl. 176—36 C** **9 Claims**

1. A control rod assembly adapted for use in a nuclear reactor, said control rod assembly comprising a control rod having a shoulder, a drive shaft assembly, a coupling connecting said drive shaft assembly to said control rod and cooperating pin and cylindrical detent members connected to said drive shaft for operating said coupling to couple and uncouple said drive shaft assembly from said control rod, said cylindrical detent member being formed to captively hold said pin member in contact with said detent member in one of two axially spaced positions, one position creating coupling and the second position creating uncoupling of the drive shaft assembly from the control rod, said detent member being moved from one position to the other by a predetermined unidirectional rotation of said detent member which results from a lowering and subsequent lifting of said drive shaft assembly, said coupling including a plunger member and a radially biased resilient member having a shoulder cooperatively configured to engage said control rod shoulder, said resilient and plunger members being affixed to said drive shaft assembly and axially movable with respect to one another upon said movement of said detent member so as to radially move said resilient member shoulder into and out of engagement with said control rod shoulder.



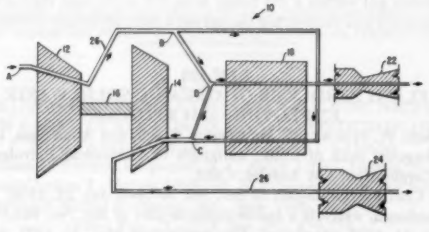
---

**4,147,590**

## NUCLEAR PROPULSION APPARATUS WITH ALTERNATE REACTOR SEGMENTS

**Thomas Szekely, Santa Monica, Calif., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed Sep. 1, 1965, Ser. No. 484,488**
**Int. Cl.[2] G21D *1/00***
**U.S. Cl. 176—39** **12 Claims**



1. Nuclear propulsion apparatus comprising:
a. means for compressing incoming air;
b. nuclear fission reactor means for heating said air;
c. means for expanding a portion of the heated air to drive said compressing means;

d. said nuclear fission reactor means being divided into a plurality of radially extending segments;
e. means for directing a portion of the compressed air for heating through alternate segments of said reactor means and another portion of the compressed air for heating through the remaining segments of said reactor means; and
f. means for further expanding the heated air from said drive means and the remaining heated air from said reactor means through nozzle means to effect reactive thrust on said apparatus.

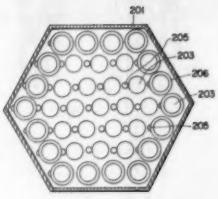
---

**4,147,591**

## FUEL ASSEMBLY OF FAST BREEDER REACTOR

**Kazuyoshi Miki, Kawasaki, Japan, assignor to Hitachi, Ltd., Japan**

**Filed Jun. 28, 1977, Ser. No. 811,140**
**Claims priority, application Japan, Jul. 9, 1976, 51-80916**
**Int. Cl.[2] G21C *3/08***
**U.S. Cl. 176—81** **12 Claims**




1. A nuclear reactor fuel assembly comprising,
a wrapper tube for flowing coolant therethrough,
a plurality of cladding tubes filled with fuel material, said cladding tubes being provided with wound wire spacers and arranged within said wrapper tube,
spacing means mounted at upper end portions of said cladding tubes which are adjacent to said wrapper tube for keeping said cladding tubes from contact with said wrapper tube during the reactor operation.

---

**4,147,592**

## PURIFICATION OF UROKINASE

**Yasuo Bai, Sakai; Hideki Yanagi, Toyoraka; Junichi Yoshikawa, and Shigeo Ogino, both of Nishinomiya, all of Japan, assignors to Sumitomo Chemical Company Limited, Osaka, Japan**

**Filed Mar. 6, 1978, Ser. No. 883,746**
**Claims priority, application Japan, Mar. 10, 1977, 52/26726**
**Int. Cl.[2] C07G *7/026***
**U.S. Cl. 195—66 B** **3 Claims**

1. A process for purifying urokinase which comprises contacting a crude aqueous solution of urokinase with an ionic pullulan gel within a pH range from 6.0 to 9.0 and thereafter separating and recovering therefrom a pure urokinase solution.

---

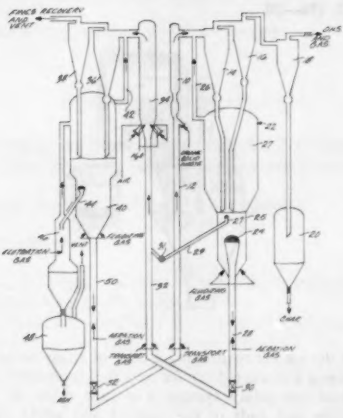
**4,147,593**

## FLASH PYROLYSIS OF ORGANIC SOLID WASTE EMPLOYING ASH RECYCLE

**Robert W. Frischmuth, Huntington Beach, and Allan Sass, Los Angeles, both of Calif., assignors to Occidental Petroleum Corporation, Los Angeles, Calif.**

**Continuation-in-part of Ser. No. 707,441, Jul. 21, 1976, abandoned, which is a continuation-in-part of Ser. No. 603,875, Aug. 11, 1975, abandoned. This application Mar. 10, 1977, Ser. No. 776,234**
**Int. Cl.[2] C10B *49/16, 53/02***
**U.S. Cl. 201—21** **23 Claims**

1. In a process for the treatment of solid waste in which a waste solid is separated into an organic fraction and solid organic solid waste fraction containing entrained particulate inorganic constituents and in which after comminution and drying the organic solid is pyrolyzed to form a carbon containing solid residue of pyrolysis, a condensable pyrolytic oil and gas, the improvement which comprises:
(a) combining and transporting the dried comminuted organic solid waste fraction, including the particulate inorganics, which fraction is of a particle size in which the largest particle dimension is less than one inch, a carrier gas which is nondeleteriously reactive with the pyrolysis products, and a hot particulate inorganic solid heat source formed from decarbonization of the carbon containing solid residue of pyrolysis and having a bulk density from about 35 to about 70 lbs./cu. ft. as the prime source of heat for pyrolysis under transport turbulent flow conditions through a pyrolysis zone maintained at a temperature



from about 600° F. to less than the sintering temperature of the inorganic solid heat source for a time sufficient to form from the organic solid waste the carbon containing solid residue and condensable pyrolytic oils and gases;
(b) separating the carbon containing solid residue of pyrolysis in admixture with the inorganic solid heat source from the condensable pyrolytic oils and gases;
(c) decarbonizing at least a portion of the carbon containing solid residue of pyrolysis to form additional hot inorganic solid heat source, the decarbonization of the carbon containing solid residue of pyrolysis occurring at a temperature below the fusion temperature of the resultant inorganic solid heat source;
(d) recycling at least a portion of the formed hot inorganic solid source of heat to the pyrolysis zone.

---

**4,147,594**

## ONE-SPOT CYLINDRICAL COKE QUENCHING CAR AND QUENCHING METHOD

**George R. Cain, Pittsburgh; Ward F. Gidick, West Newton, and William D. Edgar, Allison Park, all of Pa., assignors to Koppers Company, Inc., Pittsburgh, Pa.**

**Filed Apr. 7, 1977, Ser. No. 785,366**
**Int. Cl.[2] C10B *33/00, 39/10***
**U.S. Cl. 201—39** **19 Claims**

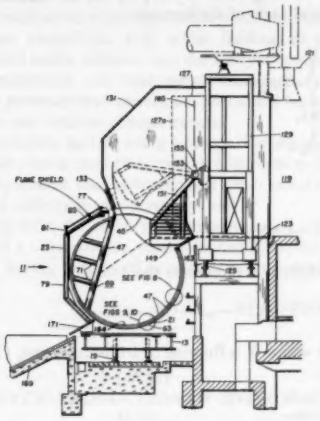
1. Apparatus for receiving and transporting hot coke pushed from a coking chamber of a coke oven battery comprising:
(a) a vehicle that is movable along the coke exit side of a coke oven battery, parallel to said battery;
(b) a rotatable tubular vessel having closed ends, a tubular shell and at least one opening in said tubular shell through which said hot coke passes into said vessel;
(c) means rotatably mounting said vessel on said vehicle arranged such that the axis of rotation of said vehicle is

horizontal and parallel to the direction of movement of said vehicle;

(d) means for rotating said vessel, as mounted on said vehicle;

(e) means, within said vessel, disposed peripherally adjacent said at least one opening for supporting and leveling said coke;

(f) means incorporated into said vessel by which said hot coke, within said vessel, can be quenched;



(g) means, mounted to said vehicle, to prevent escape of dust and gases emanating from said hot coke within said vessel, forming a fixed fume hood over at least a portion of said vessel; and

(h) means, mounted to said vessel, for collecting and conducting out of said vessel, dust and gases emanating from said hot coke and steam and particulate matter effluent from said quenching of said hot coke.

---

**4,147,595**

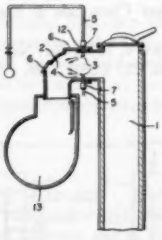
## SPRINKLER FOR VENT PART OF ASCENSION PIPE OF COKE OVEN

**Yukio Masuda, and Hiroshi Naoi, both of Kakogawa, Japan, assignors to Kansai Netsukagaku Kabushiki Kaisha, Hyogo and Ikio Tekkosho, Fukuoka, both of, Japan**

**Continuation of Ser. No. 688,752, May 21, 1976, abandoned. This application Nov. 23, 1977, Ser. No. 854,383**

**Int. Cl.[2] C10B** *43/00*

**U.S. Cl. 202—241** **3 Claims**



1. In a vent part of an ascension pipe of a coke oven, a sprinkler, disposed in a vent pipe for connecting a horizontal coke oven chamber and a collecting main pipe thereof to the outside, which comprises:

at least one sprinkler nozzle body in the form of a substantially straight pipe being fitted through a hole formed in the vent pipe and having a threaded portion formed on an outer wall of the sprinkler nozzle body adapted to be threadably secured to a threaded portion formed around the hole in the vent pipe;

one or more spray holes for spraying water in a substantially transverse direction to the axis of said nozzle body being formed at the inner end of said nozzle body extending into said vent pipe and a spray passage extending through an end portion of said straight nozzle disposed in said vent pipe;

the rear end of said nozzle body extending outside of said vent pipe being externally threaded; and

a branch pipe which is branched from a main feed pipe supported on another member equipped on an oven roof being readily disconnectably connected to said rear end of said nozzle body through an internally threaded pipe joint member,

wherein a straight nozzle having a reduced sectional area of passage is formed at the inner end of said nozzle body and said spray holes are formed in upwardly slanting directions on the side wall of the reduced sectional area of the inner end of said straight nozzle body to provide fluid spray to the upper portion of said vent pipe, and said coke oven is an OTTO type coke oven.

---

**4,147,596**

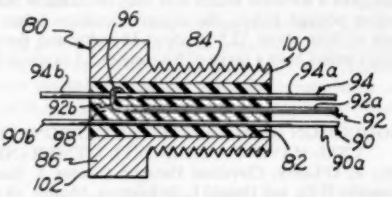
## METHOD AND APPARATUS FOR MONITORING THE EFFECTIVENESS OF CORROSION INHIBITION OF COOLANT FLUID

**Robert Baboian, Johnston, R.I., and Gardner S. Haynes, Attleboro, Mass., assignors to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Dec. 30, 1977, Ser. No. 866,074**

**Int. Cl.[2] G01N** *27/46;* **F01P** *5/14*

**U.S. Cl. 204—1 T** **10 Claims**




1. Apparatus for monitoring the corrosivity of fluid, comprising reservoir defining means, a reference electrode mounted in and electrically isolated from the reservoir means and extending into the reservoir, a pair of sensing electrodes extending into said reservoir and composed of dissimilar materials wherein one of the materials is either steel or aluminum, said pair of sensing electrodes being physically electrically short circuited together and mounted in and electrically isolated from the reservoir defining means and the reference electrode, and high impedance voltage responsive means coupled across the reference and sensing electrodes respectively.

---

**4,147,597**

## METHOD FOR PRODUCING ELECTROLYTIC NICKEL IN PARTICULATE FORMS UNDER CONDITION OF HIGH AND VARIABLE INTERNAL STRESS

**William G. Borner, Ringwood, N.J.; Aloys J. Dill, Tappan, N.Y., and Gordon L. Fisher, Mahwah, N.J., assignors to The International Nickel Company, Inc., New York, N.Y.**

**Filed Feb. 21, 1978, Ser. No. 879,728**

**Int. Cl.[2] C25D** *1/04, 17/12*

**U.S. Cl. 204—12** **5 Claims**

1. An electrodeposition mandrel for nickel comprising a plurality of electrically interconnected small area surfaces in planar array made of a metal inert to nickel electrolyte surrounded in essentially the plane of said array by electrically

insulating material and means to connect said surfaces into a direct current electric circuit said surfaces having a surface finish produced by grit blasting with a grit selected from the group of aluminum oxide grit and cast iron grit thereby providing a plurality of sharply defined micro indentations, each indentation being of a shape ranging from cup-shape to pyramidal shape, said surface finish being of about 25 to about 150 microinches RMS when produced by aluminum oxide blasting and being about 130 to about 300 microinches RMS when produced by cast iron grit blasting.

---

**4,147,598**

## METHOD FOR PRODUCING COLORED ANODIC OXIDE FILMS ON ALUMINUM BASED ALLOY MATERIALS

**Fumio Shigeta, and Kazuyoshi Kaneda, both of Shizuoka, Japan, assignors to Riken Keikinzoku Kogyo Kabushiki Kaisha, Shizuoka, Japan**

**Continuation of Ser. No. 670,247, Mar. 25, 1976, abandoned. This application Sep. 22, 1977, Ser. No. 835,833**

**Claims priority, application Japan, Aug. 27, 1975, 50-103628; China, Jan. 28, 1976, 6510196**

**Int. Cl.[2] C25D** *11/14, 11/22, 11/08*

**U.S. Cl. 204—35 N** **5 Claims**

1. A method for producing coloured oxide films comprising subjecting an aluminum based material to an anodizing treatment to produce an oxide film thereon, dipping the material in an electrolyte bath containing from about 70 to about 150 grams of water-soluble nickel salt per liter of water and from about 20 to about 50 grams of boric acid per liter of water, wherein the bath is maintained at a temperature between about 20° and about 22° C., and applying alternating voltage pulses to the aluminum based material, the alternating voltage pulses including more than one negative voltage pulse and more than one positive voltage pulse, and wherein the negative voltage puses have a duration which is at least the same as that of the positive voltage pulses, the negative voltage pulses have a range of from about 12.5 to about 15 volts, and the positive voltage pulses have a range of from about 5.5 to about 13 volts.

---

**4,147,599**

## PRODUCTION OF ALKALI METAL CARBONATES IN A CELL HAVING A CARBOXYL MEMBRANE

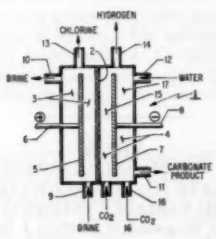
**Kevin J. O'Leary, Cleveland Heights; Charles J. Hora, Willoughby Hills, and Donald L. DeRespiris, Mentor, all of Ohio, assignors to Diamond Shamrock Corporation, Cleveland, Ohio**

**Filed Jul. 19, 1977, Ser. No. 817,007**

**The portion of the term of this patent subsequent to Mar. 21, 1995, has been disclaimed.**

**Int. Cl.[2] C25B** *1/14*

**U.S. Cl. 204—87** **18 Claims**




1. In a method for producing an alkali metal carbonate wherein:

A. an alkali metal chloride is electrolyzed in an electrolytic cell having an anode and cathode in anolyte and catholyte compartments separated by a permselective cation-exchange membrane that is impervious to hydraulic flow and is spaced apart from the cathode;

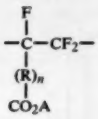
B. carbon dioxide is injected into the catholyte compartment to give catholyte solids wherein substantially all of the alkali metal hydroxide formed therein is converted to alkali metal carbonate; and

C. catholyte containing the alkali metal carbonate is removed from the catholyte compartment;

the improvement which comprises:

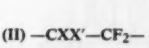
D. utilizing a membrane which:

1. consists essentially of a film having a thickness not exceeding 8 mils of a copolymer having recurring structural units of the formula:



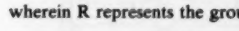
(I)

and



(II) —CXX'—$CF_2$—

wherein R represents the group



—$OCF_2$—CFY—$_m$O—$CF_2$—$(G)_e$—

in which Y is fluorine or trifluoromethyl, G is —$CF_2$— or

—CF—
$C_aF_{(2a+1)}$

m is 1, 2 or 3, e is 0 or 1, and a is an integer from 1 to 10; n is 0 or 1; A is H, Na, or K; X is fluorine, chlorine, or trifluoromethyl; X' is X or $CF_3$—$CF_2$—$_z$ wherein z is 0 or an integer from 1 to 5; the units of formula (I) being present in an amount to provide a copolymer having in the acid form an —$CO_2H$ equivalent weight of about 800 to 1400; and

2. is capable when immersed in 100° C. water of absorbing at least 15% by weight water; and

E. utilizing an electrolyzing current density in excess of one ampere per square inch of membrane area of sufficient magnitude to reduce alkali metal chloride in the catholyte solids to less than 400 parts per million.

---

**4,147,600**

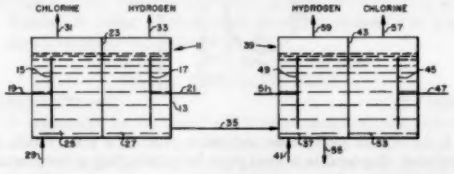
## ELECTROLYTIC METHOD OF PRODUCING CONCENTRATED HYDROXIDE SOLUTIONS

**John Rutherford, and Charles F. Eggers, both of Tacoma, Wash., assignors to Hooker Chemicals & Plastics Corp., Niagara Falls, N.Y.**

**Filed Jan. 6, 1978, Ser. No. 867,647**

**Int. Cl.[2] C25B** *1/26, 1/16*

**U.S. Cl. 204—98** **7 Claims**




1. A method of electrolytically producing a concentrated aqueous alkali metal hydroxide solution utilizing a diaphragm electrolytic cell and a membrane electrolytic cell comprising the steps of:

(a) feeding aqueous alkali metal halide into a diaphragm

electrolytic cell, said cell having a permeable diaphragm separating an anolyte and a catholyte compartment,

(b) electrolytically decomposing said alkali metal halide to produce halogen in the anolyte compartment and hydrogen and alkali metal hydroxide in the catholyte compartment,

(c) removing an aqueous solution comprising alkali metal hydroxide and alkali metal halide from said catholyte compartment,

(d) feeding said solution into the catholyte compartment of a membrane electrolytic cell, while feeding an aqueous alkali metal halide solution into the anolyte compartment of the membrane cell, said membrane electrolytic cell having a permselective membrane positioned between the catholyte and anolyte compartments,

(e) electrolytically decomposing additional alkali metal halide in said membrane cell to produce halogen in the anolyte compartment and hydrogen and alkali metal hydroxide in the catholyte compartment, and,

(f) removing from the catholyte compartment of said membrane cell a concentrated aqueous alkali metal hydroxide solution having a reduced concentration of alkali metal halide.

---

**4,147,601**

## ELECTROLYTIC PRODUCTION OF HYDROBROMIC ACID

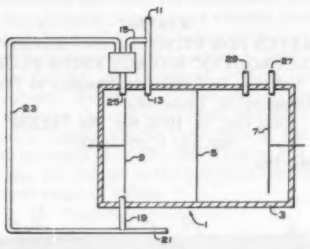
**William W. Carlin, Portland, Tex., assignor to PPG Industries, Inc., Pittsburgh, Pa.**

**Filed Jul. 28, 1977, Ser. No. 819,782**

**The portion of the term of this patent subsequent to Oct. 11, 1994, has been disclaimed.**

**Int. Cl.[2] C25B *1/22***

**U.S. Cl. 204—103** **10 Claims**



**8.** A method of producing hydrogen bromide comprising passing an electrical current through an aqueous anolyte liquor to an aqueous catholyte liquor which catholyte is separated from said anolyte liquor by a cation perm-selective membrane and which catholyte liquor contains bromine.

---

**4,147,602**

## PRODUCTION OF HYDROGEN AND CARBON DIOXIDE

**Max Garbuny, Churchill Borough, and D. Colin Phillips, Monroeville, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

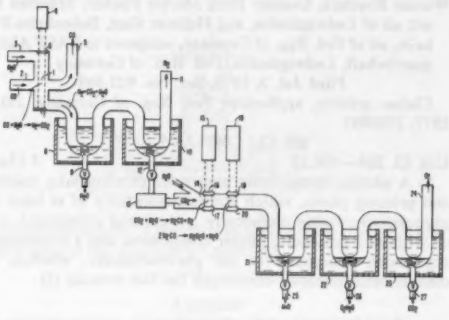
**Filed Feb. 27, 1978, Ser. No. 881,349**

**Int. Cl.[2] B01J *1/10***

**U.S. Cl. 204—157.1 R** **7 Claims**

**1.** A method of reacting carbon monoxide and water to produce carbon dioxide and hydrogen comprising, in either order,

**(1)** activating said carbon monoxide or said water with monochromatic light to form an activated specie and an unactivated specie;



**(2)** bringing said activated specie and said unactivated specie into contact.

---

**4,147,603**

## RADIATION CURABLE CELLULOSE COMPOSITIONS

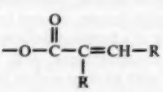
**James G. Pacifici, and Gordon C. Newland, both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Jul. 27, 1976, Ser. No. 709,016**

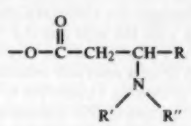
**Int. Cl.[2] C08L *1/00, 3/00***

**U.S. Cl. 204—159.12** **5 Claims**

**1.** A radiation-curable composition comprising cellulose esters having an inherent viscosity of from about 0.01 to about 2.0, modified with up to two ethylenically unsaturated carboxylate groups per anhydroglucose unit, said groups being selected from 60,$\beta$-unsaturated carboxylate groups of the formula



and $\beta$-alkylamino or $\beta$-arylamino containing carboxylate groups of the formula



wherein R is selected from H, and methyl, and R′ and R″ are the same or different and selected from alkyl of 1–8 carbons which may be mono-substituted with hydroxyl, phenyl, phenyl substituted with one alkyl group of 1–4 carbons, Cl, Br, or CN, aralkyl wherein the alkyl portion is from 1–4 carbons, and R′ and R″ taken together may form a cycloalkyl ring including the N, or may form a morpholino ring, wherein from 10 to 75 mole percent of said groups contain the $\beta$-alkylamino or $\beta$-arylamino moiety, and at least one ethylenically unsaturated monomer selected from $\alpha,\beta$-unsaturated carboxylates selected from acrylates, methacrylates, and crotonates, of monohydric and polyhydric alcohols which may be substituted with hydroxy or alkoxy groups, acrylonitrile, and styrene, the weight ratio of cellulose ester to unsaturated monomer being from 1/1 to 10/1.

## 4,147,604
## PHOTOPOLYMERIZABLE BINDERS CONTAINING DIAMINOBENZOPHENONES

**Werner Kuesters; Guenter Heil; Martin Fischer; Manfred Eisert, all of Ludwigshafen, and Hellmut Kast, Bobenheim-Roxheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

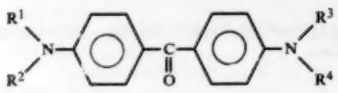
**Filed Jul. 3, 1978, Ser. No. 921,468**

**Claims priority, application Fed. Rep. of Germany, Jul. 8, 1977, 2730897**

**Int. Cl.[2] C08F** *2/46, 8/18*

**U.S. Cl. 204—159.23** **3 Claims**

1. A photopolymerizable binder for printing inks, coatings and printing plates, which consists essentially of at least one photopolymerizable olefinically unsaturated compound, with or without a polymeric binder component, and a diaminobenzophenone compound as the photosensitizer, wherein the diaminobenzophenone compound has the formula (I)



(I)

where $R^1$ and $R^3$ are $H(OR^5)_x$ radicals, $R^5$ being alkylene of 2 or 3 carbon atoms and x being 1, 2 or 3, and $R^2$ and $R^4$ are each alkyl of 1 to 4 carbon atoms or are radicals of the type of $R^1$ and $R^3$.

---

## 4,147,605
## METHOD OF PRODUCING SOLS BY ELECTRODIALYSIS

**Barry A. Schenker, Mayfield Heights; Thomas T. Sugano, Painesville; Neil W. Stillman, Madison, and Kevin J. O'Leary, Cleveland Heights, all of Ohio, assignors to Diamond Shamrock Corporation, Cleveland, Ohio**

**Continuation-in-part of Ser. No. 669,188, Mar. 22, 1976, abandoned. This application Apr. 14, 1977, Ser. No. 787,314**

**Int. Cl.[2] B01D** *13/02*

**U.S. Cl. 204—180 P** **7 Claims**

1. A process for producing a sol of an element selected from the group consisting of silicon, aluminum, antimony, chromium, manganese, molybdenum, tin and tungsten in an electrodialytic cell consisting of a housing defining an anode compartment and a cathode compartment, with the anode compartment being provided with an inlet and an outlet for feeding and removing anolyte therefrom, a cation exchange membrane separating the anode compartment from the cathode compartment, an anode positioned in the anode compartment, and a cathode positioned in the cathode compartment for passing an electrical current through the electrodialytic cell, and a conduit communicating with the inlet and the outlet of the anode compartment whereby anolyte can be circulated through the anode compartment from a reservoir containing anolyte comprising the steps of: providing a catholyte to the electrodialytic cell containing approximately 5% sodium hydroxide; providing an aqueous solution of a water soluble alkali metal salt of the oxide of the element for the sol to be produced having a concentration in the range of 0.1 to 5.0 percent as metal oxide to the reservoir for holding the anolyte for circulation through the anode compartment of the electrodialytic cell; carefully and continuously controlling the pH of the anolyte provided that if the element is silica then maintaining the anolyte pH within a range of 7.5 to 8.5, provided that if the element is antimony then maintaining the anolyte pH within a range of 9.5 to 10.5, provided that if the element is molybdenum then maintaining the anolyte pH within a range of 2.5 to 3.5, and provided that if the element is tin then maintaining the anolyte pH within a range of 10.3 to 10.8; providing to the anolyte compartment with anolyte reserve a plurality of glass beads which are fluidized so as to impinge upon the anode so as to substantially reduce the deposition of the element to be produced in sol form thereon; providing an electrical current across the anode and cathode greater than ½ ampere per square inch; electrodialytically transferring alkali metal cations of the aqueous solution of a water soluble alkali metal salt of the oxide of the said element from the anode compartment of the electrodialytic cell to the cathode compartment of the electrodialytic cell while essentially preventing the migration of metal oxide into the cathode compartment; and removing the so-produced sol from the anode compartment of the electrodialytic cell when the sol has obtained a particle size greater than 13 millimicrons and a concentration greater than 8 weight percent.

---

## 4,147,606
## CLINICAL PROCEDURE FOR MEASURING LIPOPROTEIN TRIGLYCERIDES

**Tipton L. Golias, Beaumont, Tex., assignor to Helena Laboratories Corporation, Beaumont, Tex.**

**Continuation-in-part of Ser. No. 835,387, Sep. 21, 1977, Pat. No. 4,105,521. This application Jul. 26, 1978, Ser. No. 928,049**

**Int. Cl.[2] G01N** *27/26, 33/16*

**U.S. Cl. 204—180 S** **12 Claims**

1. A method of simultaneously determining the concentrations of high density lipoprotein triglyceride, very low density lipoprotein triglyceride and low density lipoprotein triglyceride in a sample of body fluid, comprising the steps of:

a. applying a small sample of said body fluid to be tested to a solid electrophoresis support media strip,

b. applying a direct current for a predetermined period of time to said support media until the high density, very low density and low density lipoprotein triglycerides have separated on the media,

c. applying a developing substrate sensitive to small concentrations of triglycerides to the electrophoresed lipoprotein strip, and

d. quantitatively determining the concentrations of high density lipoprotein, very low density lipoprotein and low density lipoprotein triglycerides in said body fluid sample from the developed electrophoresed sample.

---

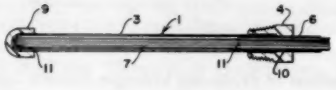
## 4,147,607
## APPARATUS FOR STIMULATING REMOVAL OF ELECTROLYTIC ENERGY FROM FLUIDS

**Leonard L. Vollman, St. Louis, Mo., assignor to Thermal Engineering Company, St. Louis, Mo.**

**Filed Oct. 14, 1976, Ser. No. 732,532**

**Int. Cl.[2] C23F** *13/00*

**U.S. Cl. 204—196** **7 Claims**




1. An apparatus for stimulating removal of electrolytic energy from a vessel of water or other charge conveying liquid, said apparatus being of the type for mounting through the wall of such a vessel, comprising, a conductive member provided for disposition within such a vessel and below its water line, a nonconductive mounting means secured with the conductive member and disposed for electrically insulating the said member from the vessel in which it is to be disposed, said mounting means being nonabsorbent of moisture and free of electrical conductivity even after its prolonged submersion in water within a vessel, said mounting means being formed of a fluoro plastic, said mounting means including an aperture therethrough, one end of said conductive member being hermetically connected and threadedly engaged within said mounting means aperture, the threads of said threaded engagement being of decreasing tapering dimension to insure a fluid tight seal between the said conductive member and the mounting means at this location, a conductor extending into the conductive

member at its mounting means end and connected to the said member at its opposite end, retaining means provided upon the mounting means for securing the conductive member to a vessel, said retaining means comprising threads, said threads being of decreasing taper in the direction of the connected conductive member, a connecting lug secured to the mounting means at the opposite end of its aperture, said lug being electrically connected with the conductor, said conductor and lug capable of being grounded, whereby said conductive member retains an electrically isolated state with respect to any vessel in which it is mounted and is capable of conducting electrolytic charge through its conductor and to ground from any water located in such a vessel.

---

**4,147,608**

## IMPRESSED CURRENT CATHODIC PROTECTION

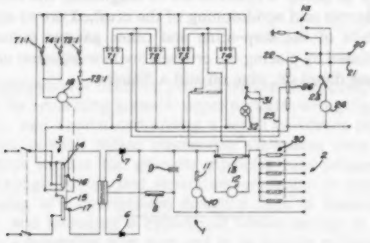
**John E. Stevens, Betchworth, England, assignor to F. A. Hughes and Co., Ltd., Surrey, England**

**Filed Sep. 26, 1977, Ser. No. 836,543**

**Claims priority, application United Kingdom, Jun. 28, 1977, 27009/77**

**Int. Cl.[2] C23F *13/00***

**U.S. Cl. 204—196** **11 Claims**



1. An apparatus for impressed current cathodic protection of a structure, the apparatus comprising a variable transformer, a rectifying circuit for rectifying the output of the variable transformer to produce the impressed current at least one anode connected to receive the impressed current, an electromechanical actuator operatively coupled to the variable transformer for adjusting the output voltage thereof, a reference electrode and a control circuit connected to the reference electrode and arranged to operate the actuator in a manner to maintain, in use, the voltage at the reference electrode within a predetermined range of values.

---

**4,147,609**

## APPARATUS FOR ELECTROCHEMICAL MACHINING OF METAL PARTS

**Vladimir I. Suslin, ulitsa Frunze 17, kv. 46; Alexandr I. Dubovik, ulitsa Gvardeitsev Shironintsev, 63a, kv. 22; Boris A. Makeev, ulitsa Novgorodskaya, 6, kv. 29; Vitaly A. Pilipenko, ulitsa Vorobieva, 15/19, kv. 2; Zinovy A. Lekarev, ulitsa Trinklera, 20, kv. 71, and Boris S. Kolyshkin, ulitsa Otokara Yarosha, 41, kv. 79, all of Kharkov, U.S.S.R.**

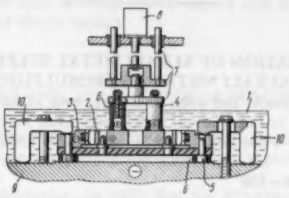
**Filed Dec. 15, 1977, Ser. No. 860,981**

**Claims priority, application U.S.S.R., Dec. 20, 1976, 2427253**

**Int. Cl.[2] B23P *1/04***

**U.S. Cl. 204—224 M** **1 Claim**

1. In an apparatus for electrochemical machining of metal parts comprising, an electrode-tool energized for electrochemical machining of a metal workpiece, bar-type electrodes having contact end surfaces for applying a potential across the workpiece to be machined and said electrode-tool, an elastic sleeve of a dielectric material for each bar-type electrode disposed over the corresponding bar-type electrode and having an axial portion extending axially beyond said contact surface, whereby when each said bar-type electrode is engaged with the contact surface thereof making contact with said workpiece for applying a potential thereto the axial portion of the sleeve is compressed and deformed to effect a fluidtight



seal circumferentially of the corresponding contact surface and surface area of the workpiece contacted.

---

**4,147,610**

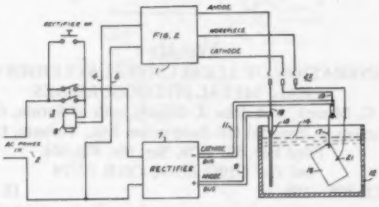
## INDICATORS AND SHUTDOWN SYSTEM FOR PLATING

**David W. Larson, 3224 N. 425 E., North Ogden, Utah 84404**

**Filed May 3, 1978, Ser. No. 903,291**

**Int. Cl.[2] C25D *17/00*; C25F *3/02***

**U.S. Cl. 204—228** **5 Claims**




1. An electrical circuit for monitoring, displaying and controlling the processes in an electrolytic plating and etching system, comprising:

a. a first means responsive to the polarity of a voltage between its first and second input leads, for making connections between three output leads of the means, so that, zero voltage between the input leads produces no connection between any of the output leads, a positive voltage at the first input lead with respect to the second lead produces a connection between the first and the second output leads, and a negative voltage at the first input lead with respect to the second lead produces a connection between the first and the third output leads;

b. a second means responsive to the polarity of an electric voltage between its first and second input leads, for making connections between three output leads of the means, so that, zero voltage between the input leads produces no connection between any of the output leads, a positive voltage at the first input lead with respect to the second lead produces a connection between the first and the second output leads, and a negative voltage at the first input lead with respect to the second lead produces a connection between the first and the third output leads;

c. an electrical connection of the first input lead of the first means and the anode bus bar in the plating system;

d. an electrical connection of the second input lead of the second means and the cathode bus bar in the plating system;

e. an electrical connection of the second input of the first means, the first input of the second means, and a lead capable of being attached to a workpiece;

f. an electrical connection of the second output lead of the first means, the third output lead of the second means, and a means responsive to electric power for indicating that the workpiece is being plated;

g. an electrical connection of the third output lead of the first

means, the second output lead of the second means, and a means responsive to electrical power for indicating that the workpiece is being etched.

---

4,147,611

## REGENERATION OF ALKALI METAL SULFIDES FROM ALKALI METAL HYDROSULFIDES

Peter G. Miasek, and John J. Dugan, both of Sarnia, Canada, assignors to Imperial Oil Enterprises Ltd., Toronto, Canada

Filed Feb. 13, 1978, Ser. No. 876,898
Int. Cl.[2] C10G *13/06;* C01B *17/26*
U.S. Cl. 208—108 19 Claims

1. A process for the conversion of an alkali metal hydrosulfide to an alkali metal sulfide, which comprises contacting alkali metal hydrosulfide, produced during the hydroconversion of a heavy carbonaceous feedstock by contact of said feedstock with an alkali metal sulfide, with water and carbon dioxide at a temperature and pressure sufficient to convert about 50% of said alkali metal hydrosulfide to an alkali metal carbonate, and heating a mixture of said alkali metal carbonate, unreacted alkali metal hydrosulfide, and coke to an elevated temperature sufficient to cause reaction of the alkali metal hydrosulfide with the alkali metal carbonate whereby an alkali metal sulfide is formed.

---

4,147,612

## REGENERATION OF ALKALI METAL SULFIDES FROM ALKALI METAL HYDROSULFIDES

Peter G. Miasek, and John J. Dugan, both of Sarnia, Canada, assignors to Imperial Oil Enterprises Ltd., Toronto, Canada

Filed Feb. 13, 1978, Ser. No. 876,904
Int. Cl.[2] C10G *13/06;* C01B *17/26*
U.S. Cl. 208—108 11 Claims

1. A process for the conversion of an alkali metal hydrosulfide to an alkali metal sulfide, which comprises contacting said alkali metal hydrosulfide with a metal oxide thereby producing said alkali metal sulfide.

---

4,147,613

## HYDROCARBON CONVERSION PROCESS UTILIZING A CATALYST COMPRISING A ZEOLITE, A ZIRCONIA-CONTAINING MATRIX AND AN ADSORBENT

Elroy M. Gladrow, Baton Rouge, La., assignor to Exxon Research & Engineering Co., Florham Park, N.J.

Division of Ser. No. 836,221, Sep. 21, 1977, which is a continuation-in-part of Ser. No. 746,188, Nov. 30, 1976, which is a continuation-in-part of Ser. No. 626,225, Oct. 28, 1975, abandoned. This application Dec. 19, 1977, Ser. No. 862,175
Int. Cl.[2] C10G *11/04;* B01J *29/12*
U.S. Cl. 208—120 11 Claims

1. A process for the conversion of a hydrocarbon oil, which comprises:

contacting said oil at hydrocarbon conversion conditions with a catalyst comprising (1) from 3 to about 16 weight percent of a crystalline aluminosilicate zeolite, (2) from about 50 to about 85 weight percent of an inorganic oxide gel component, said inorganic oxide gel comprising a major amount of silica, a minor amount of zirconia and a minor amount of alumina, and (3) from about 15 to about 40 weight percent of a porous substantially inert inorganic oxide adsorbent having a surface area greater than about 200 square meters per gram and having at least 0.2 cubic centimeter per gram of its pore volume in pores ranging in diameter from about 90 to about 200 Angstroms, said catalyst having at least 0.4 cubic centimeter per gram of its pore volume in pores of greater than 90 Angstroms in diameter.

4,147,614

## AQUEOUS MIXTURE OF DIESEL OIL, PINE OIL AND DIAMINE FOR CONDITIONING OF CRUSHED MAGNESITE ORE IN MAGNETIC BENEFICIATION PROCESS

Theodor Gambopoulos, Xenokratous 37, and Antonios Frangiskos, Serifou 18, both of Athens, Greece

Continuation-in-part of Ser. No. 803,642, Jun. 6, 1977, abandoned. This application Jul. 8, 1977, Ser. No. 814,039
Claims priority, application Greece, Jun. 10, 1976, 50954
Int. Cl.[2] B03C *1/00*
U.S. Cl. 209—8 7 Claims

1. In a beneficiation process for the recovery of pure magnesite from magnesite ores containing magnesite, serpentine and other gangue material which includes the crushing a quantity of magnesite ore, conditioning the crushed ore to activate the surface of the serpentine and other gangue material, further conditioning the crushed ore in a suspension of a finely divided strongly ferromagnetic material so as to coat selective by the surface of the serpentine and the other gangue material as well as the strongly siliceous and carbonaceous particles of the ore, and removing the serpentine and the other gangue material as well as the strongly siliceous and carbonaceous particles of the ore from the remainder of the ore by means of a magnetic separator to obtain a concentrate of magnesite, the improvement wherein said conditioning of the crushed ore to activate the surface of the serpentine and other gangue material is accomplished by placing the crushed ore in an aqueous mixture containing diesel oil, pine oil and a diamine.

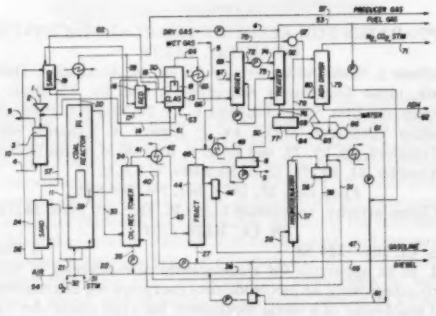
---

4,147,615

## HOT SAND-COAL-CRACKING TO HYDRODISTILLATE FUELS

Arnold M. Leas, 309 E. Van Buren, Columbia City, Ind. 46725

Filed Apr. 12, 1977, Ser. No. 786,927
Int. Cl.[2] C10G *1/04*
U.S. Cl. 208—9 7 Claims



1. A method of producing fuel liquids and gases from a solid hydrocarbonaceous material which comprises contacting said hydrocarbonaceous material with an iron group metal silicide in the presence of an oxygen-containing gas and steam, at hydrocarbonaceous material conversion conditions to form iron group metal silicate and a fuel liquid and gas product.

4,147,616

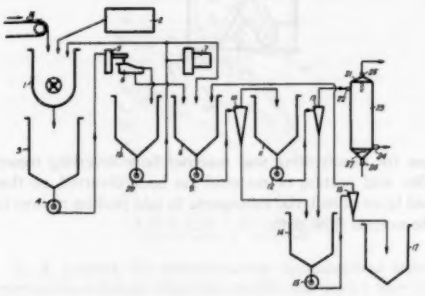
## APPARATUS FOR DEINKING PRINTED WASTEPAPERS

Cestmir Balcar, Roztoky; Antonin Kostka, Bratislava; Jaroslav Havranek, Bratislava, and Marcel Lalak, Bratislava, all of Czechoslovakia, assignors to Vyskumny ustav papieru a celulosy of Bratislava, Bratislava, Czechoslovakia

Continuation-in-part of Ser. No. 233,034, Mar. 9, 1972, abandoned, Ser. No. 478,286, Jun. 11, 1974, abandoned, and Ser. No. 582,368, May 30, 1975, Pat. No. 4,013,505. This application Dec. 22, 1976, Ser. No. 753,568

Int. Cl.[2] B03B *9/00;* B03D *1/24;* B04C *5/26*

U.S. Cl. 209—12 4 Claims



1. Apparatus for deinking printed wastepapers, comprising a system for separating granular paper particles with printing ink content, said system comprising a series of vortex separator batteries, conduit means connecting successive ones of the separators so that the granular particles pass progressively therethrough, all of said separators gradually progressively decreasing in a downstream direction both in diameter and length; and including a cylindrical vessel having in its top portion a tangential inlet port and in its bottom portion a tangential outlet port, both of said inlet and outlet ports being oriented in the direction of the vortex created in the separators, the uppermost part of said cylindrical vessel being provided with an axial outlet tube for taking off the finest contaminants while the lowermost part thereof is provided with an inlet tube for supplying thereinto a gaseous medium or water/gas dispersion for causing said medium, before entering the last-mentioned separator, to pass through a perforated partition adapted for uniformly distributing the gaseous medium throughout the entire separator cross-section.

4,147,617

## PROCESSING HYDROCARBON FEED OF HIGH CARBON RESIDUE AND HIGH METALS CONTENT

Donald M. Nace, Woodbury, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Apr. 6, 1978, Ser. No. 894,205

Int. Cl.[2] B01J *8/24;* C10G *11/04*

U.S. Cl. 208—74 7 Claims

1. A method for converting a high boiling hydrocarbon residua comprising greater than 3 ppm of nickel equivalent of metals and coke forming asphaltenes to produce lower boiling more desirable components which comprises,

contacting said high boiling hydrocarbon residua comprising metal contaminants with a coke deactivated catalyst for a period of time less than 2 seconds at a temperature restricting conversion of the residua to gasoline and lower boiling components within the range of 20 to 40 volume percent,

separating a product of said residua conversion operation to recover material higher boiling than gasoline and including a 650° F. plus recycle fraction substantially free of metals, and

converting the recovered 650° F. plus recycle fraction freed of metals in the presence of freshly regenerated catalyst at a temperature in excess of 950° F. whereby a high level of conversion to gasoline and lower boiling hydrocarbon constituents in the range of 60 to 80 volume percent is obtained thereby providing a coke deactivated catalyst thereafter used to effect conversion of said hydrocarbon residua as above recited.

4,147,618

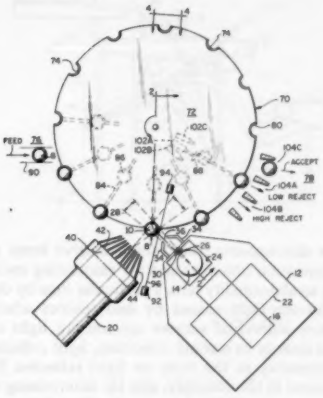
## METHOD AND APPARATUS FOR MEASURING PRODUCT CONTENTS

Carl Richardson, Bedford, and Philip A. Wiley, Boxboro, both of Mass., assignors to Bedford Engineering Corporation, Bedford, Mass.

Filed Mar. 14, 1977, Ser. No. 777,436

Int. Cl.[2] B07C *5/16, 5/344*

U.S. Cl. 209—589 24 Claims



1. A system for measuring the mass of the contents of a product, the mass of said contents being small relative to the total mass of said product, said system comprising:

means for conveying products along a predetermined path through an inspection station;

irradiation means disposed adjacent said inspection station for directing a beam of penetrating radiation transversely to said path so that at least a portion of the volume of each product conveyed through said station is substantially instantaneously exposed to said beam of penetrating radiation;

radiation detector means positioned adjacent said station for producing an electrical signal representative substantially only of the amount of received radiation which is scattered by the contents of the irradiated product; and

means for determining the mass of the contents of each product irradiated by said beam as a function of said electrical signal.

4,147,619

## ELECTRONIC SORTING APPARATUS

Norman B. Wassmer; Franklyn G. Anderson, and Joseph L. Hodges, all of Ontario, Oreg., assignors to Ore-Ida Foods, Inc., Boise, Id.

Filed Dec. 9, 1976, Ser. No. 748,063

Int. Cl.[2] B07C *5/342*

U.S. Cl. 209—565 21 Claims

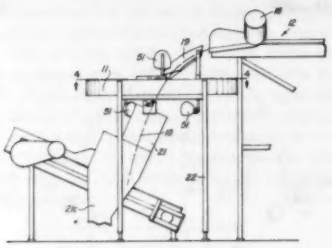
1. Apparatus for sorting items, each of which exhibit substantially uniform light reflectivity if the item is in normal condition and different light reflectivity for any portion or portions thereof that are in abnormal condition, comprising:

an illumination chamber for substantially uniformly illuminating the items to be sorted and for establishing a substantially uniformly illuminated background at a different

light level from that of the light reflected by the items to be sorted and by abnormalities in the items to be sorted;

means for successively passing a stream of items to be sorted through the illumination chamber;

at least one set of a multiplicity of individual light, each set arranged to sense light reflected in substantially a single direction from items passing through the illumination chamber, the individual light sensors of a set being localized as a closely associated group so as to each sense only a small portion of the total light sensed by the set, each of said individual light sensors being capable of sensing differences in light reflected from the items in their normal condition, light reflected from one or more abnormalities in the items, and light reflected from the background in the chamber;



means for distinguishing between sucessive items entering the illumination chamber and for associating each sensor sensing an abnormality with a particular item by determining from the light sensed by said sensors whether the respective individual sensors are sensing light reflected from an item in its normal condition, light reflected from an abnormality in the item, or light reflected from the background in the chamber, and for determining whether the number of individual sensors sensing abnormalities in a particular item is greater than a predetermined number;

means for rejecting an item from the stream of items if the number of sensors sensing abnormalities in an item is greater than the predetermined number; and

means for delaying operation of said rejecting means until the item to be rejected reaches the rejecting means along its path of travel following the sensing operation.

---

**4,147,620**

## METHOD AND APPARATUS FOR SORTING CONTAMINANT MATERIAL FROM PROCESSING MATERIAL

**Adrian Artiano, Everett; Darrell H. Halgrimson, Edmonds, and Henry W. Joselovitz, Marysville, all of Wash., assignors to Black Clawson Inc., Everett, Wash.**

**Filed Jun. 15, 1977, Ser. No. 807,721**
**Int. Cl.[2] B07C *5/00***
**U.S. Cl. 209—590** **13 Claims**

1. An apparatus for sorting contaminant material such as rocks and metal from processing material such as wood chips, mixed to form a continuous layer of material, comprising:

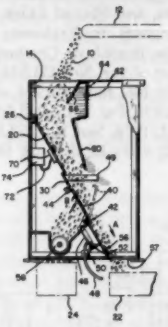
means for impinging a layer of material on a surface which can be vibrated thereby;

means for sensing vibrations of said surface;

means for generating signals corresponding to said vibrations;

means for distinguishing between signals generated in response to impact of said processing material from response to impact of said contaminant material including means for distinguishing between the amplitudes and durations of vibration of said surface caused respectively by said processing material and said contaminant material;

material flow diverting means activated only in response to a signal generated by impact of said contaminant material on said surface, so as to divert the flow of a portion of said layer of material containing said contaminant material from the normal flow path of said layer of material; and



means for deactivating said material flow diverting means after said portion of material has been diverted, so that said layer of material subsequent to said portion returns to the normal flow path.

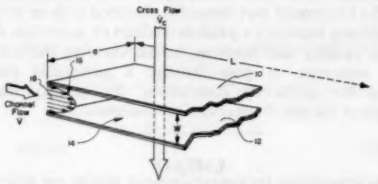
---

**4,147,621**

## METHOD AND APPARATUS FOR FLOW FIELD-FLOW FRACTIONATION

**John C. Giddings, Salt Lake City, Utah, assignor to University of Utah, Salt Lake City, Utah**

**Filed Jun. 28, 1977, Ser. No. 810,835**
**Int. Cl.[2] B01D *13/00, 3/00***
**U.S. Cl. 210—22 C** **13 Claims**




7. A method of establishing a crossflow across a field-flow fractionation channel having elongated first and second plates substantially defining a narrow flow channel therebetween, said method comprising the steps of:

(a) selecting a semipermeable material suitable for passage of a crossflow fluid therethrough,

(b) adapting said semipermeable material with rigid structure to enable use thereof as a semipermeable plate in a field-flow fractionation system,

(c) constructing a flow field-flow fractionation channel using said semipermeable plates as first and second plates, and

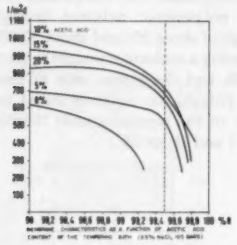
(d) applying a regulated rate of fluid cross flow at said first plate means, in combination with a channel fluid flow, to establish a cross-flow, substantially perpendicular to said channel flow.

12. A method as defined in claim 7, wherein said steps are adapted to perform a method of application selected from the group consisting of ultrafiltration, pressure dialysis, and purification.

## 4,147,622
## PROCESS FOR MANUFACTURING MEMBRANES FOR OSMOTIC SEPARATION

**Dietmar G. Nussbaumer, Göttingen, Fed. Rep. of Germany, assignor to Sartorius Membran-Filter GmbH, Göttingen, Fed. Rep. of Germany**

**Filed Mar. 18, 1977, Ser. No. 779,222**
**Claims priority, application Fed. Rep. of Germany, May 14, 1976, 2621519**
**Int. Cl.[2] B01D *13/00***
**U.S. Cl. 210—23 H** **40 Claims**



**1.** A process for manufacturing asymmetrical selectively permeable cellulose triacetate membranes with a skin layer on at least one side of the membrane, comprising:

casting a low-molecular cellulose triacetate, having a viscosity, measured as a 2% solution in methylene chloride methanol 9:1, at 25° C., of a maximum of 10 cp and having an acetyl content of at least about 43%, dissolved in a mixture of solvents, to form a membrane, said solution consisting essentially of at least 50% acetone, a solvent for the cellulose triacetate, and a swelling agent for the cellulose triacetate, whereby the swelling agent is added to the solution as the last component, the concentration of the triacetate in the solution being 12–20%, and the swelling agent 5–15%, and the ratio of acetone to solvent being at least 1.25:1;

exposing the cast membrane to evaporation for 2 to 90 seconds; and

precipitating in cold water of room temperature or below.

**34.** An asymmetrical selectively permeable cellulose triacetate membrane prepared in accordance with the process of claim **1**.

---

## 4,147,623
## HYDROXYLAMINE PURIFICATION VIA ION EXCLUSION

**Fred W. Koff, Long Valley; Allen A. Tunick, Boonton, and Stylianos Sifniades, Madison, all of N.J., assignors to Allied Chemical Corporation, Morris Township, Morris County, N.J.**

**Filed Oct. 28, 1977, Ser. No. 846,668**
**Int. Cl.[2] B01D *15/04***
**U.S. Cl. 210—31 R** **20 Claims**

**1.** A process for separating hydroxylamine from aqueous solutions containing hydroxylammonium salts in mixture with salts of cations whose corresponding bases have base dissociation constants of at least $10^{-7}$ comprising:

(a) bringing such solution to a pH of between about 6 and 11;

(b) sequentially passing the resulting solution and water through a cation exchange resin bed loaded with charge compensating cations which will compose a base having, in aqueous solution a base dissociation constant substantially greater than that for hydroxylamine ($K_b = 10^{-8}$) or through an anion exchange resin bed loaded with charge compensating anions, which will compose an acid having in aqueous solution an acid dissociation constant substantially greater than that for hydroxylammonium ion ($K_a = 10^{-6}$);

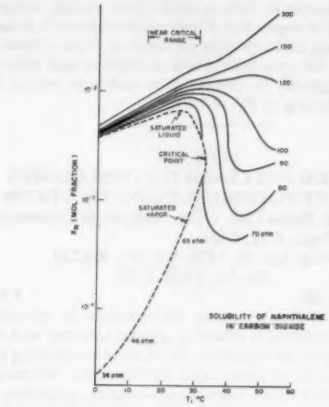
(c) removing from the bed a first effluent containing predominantly cations eluted from such cation exchange resin bed or anions eluted from such anion exchange bed and a later effluent containing predominantly hydroxylamine thereby separating the hydroxylamine from the aforesaid salts.

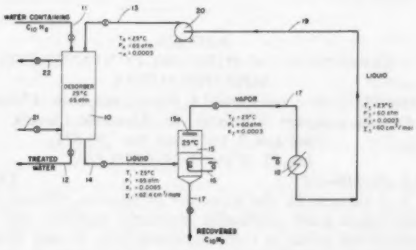
---

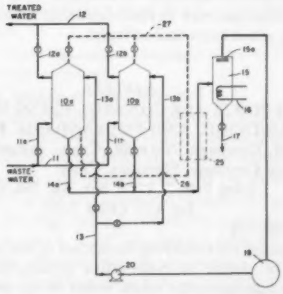
## 4,147,624
## WASTEWATER TREATMENT WITH DESORBING OF AN ADSORBATE FROM AN ADSORBENT WITH A SOLVENT IN THE NEAR CRITICAL STATE

**Michael Modell, Cambridge, Mass., assignor to Arthur D. Little, Inc., Cambridge, Mass.**

**Filed Apr. 15, 1976, Ser. No. 677,390**
**Int. Cl.[2] B01D *15/06, 15/00*; B01J *21/20, 29/38***
**U.S. Cl. 210—32** **11 Claims**




**1.** A process for removing organic impurities from wastewater, comprising the steps of

a. contacting an adsorbent with wastewater containing organic impurities thereby to adsorb said impurities as adsorbates on said adsorbent; b. contacting said adsorbent containing residual water remaining on said adsorbent subsequent to step (a) and having said adsorbate adsorbed thereon with a solvent for said residual water and said adsorbate, said solvent being inert to said adsorbent and being a liquid in the near critical state wherein the temperature of said solvent ranges between about 0.95 and 0.995 times its critical temperature in degrees K and the pressure of said solvent is at least equivalent to its vapor pressure at the temperature at which it is used, thereby to remove said residual water and to desorb said adsorbate and dissolve it in said near critical liquid;

c. separating said near critical liquid with said residual water and said adsorbate dissolved therein from said adsorbent;

d. vaporizing at least a portion of said near critical liquid containing said residual water and said adsorbate dissolved therein to form a multi-phase system comprising solvent-rich vapor and a water/adsorbate-rich phase;

e. condensing said solvent-rich vapor to form a liquid; and

f. adjusting the temperature and pressure of said liquid from step (e) thereby to convert it to said near critical liquid from recycling in the process.

---

**4,147,625**

## METHOD FOR CLARIFYING DISCOLORED TRIMETHYLHYDROQUINONE SOLUTIONS

**John R. Dodd, Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla.**

**Filed Apr. 26, 1978, Ser. No. 900,210**
**Int. Cl.[2] C02B *1/20***
**U.S. Cl. 210—50** **6 Claims**

1. A method for removing discoloration in trimethylhydroquinone dissolved in effective organic solvents, said discoloration caused by air oxidation, the method comprising adding effective amounts of alkali metal borohydrides selected from the group consisting of lithium borohydride, potassium borohydride, sodium borohydride, or mixtures of these to the discolored solution.

---

**4,147,626**

## TREATMENT OF MERCURY CONTAMINATED AQUEOUS MEDIA

**David M. Findlay, and Ronald A. N. McLean, both of Montreal, Canada, assignors to Domtar Inc., Montreal, Canada**

**Filed Jan. 7, 1977, Ser. No. 757,573**
**Int. Cl.[2] C02C *5/04*; C01D *1/08***
**U.S. Cl. 210—52** **7 Claims**

1. A process for the treatment of aqueous effluent from a chlor-alkali plant containing elemental mercury and other undissolved solids to convert substantially all said elemental mercury to a stable form that does not contaminate the environment consisting essentially of: adding a water-soluble polysulfide to said solids containing effluent at a pH in the range 7–13 in an amount sufficient to combine with substantially all said elemental mercury to form insoluble mercury sulfide and separating solids from said effluent.

---

**4,147,627**

## PROCESS FOR SCALE CONTROL USING MIXTURES OF POLYCATIONIC AND POLYANIONIC POLYMERS

**Richard M. Goodman, Norwalk, Conn., assignor to American Cyanamid Company, Stamford, Conn.**

**Filed Feb. 7, 1977, Ser. No. 766,330**
**Int. Cl.[2] C02B *5/06***
**U.S. Cl. 210—58** **14 Claims**

1. A process for inhibiting formation of magnesium hydroxide scale or sludge in evaporative desalination units which comprises adding to the saline water being processed in said units an effective amount of a mixture of (1) a polyanionic polymer containing at least about 50 mole percent or repeating units derived from an acrylic acid and any balance of repeating units derived from one or more monomers compatible therewith, the acid units being in the form of at least one member selected from the group consisting of free acid radical, ammonium salt, and alkali metal salts, and (2) a polycationic polymer selected from the group consisting of (a) dimethylaminepolyamine-epichlorohydrin reaction product wherein the amount of said polyamine is from 0 to about 15 mole percent of the total amine content and the amount of said epichlorohydrin is from at least the molar equivalent of the total amine content up to the full functional equivalent of said amine content, (b) poly(-dimethyldiallylammonium chloride), (c) quaternarized derivatives of poly(dimethylaminoethylmethacrylate), and (d) poly-[oxyethylene(dimethylimino)ethylene(dimethylimino)ethylene dichloride], said polyanionic polymer having a molecular weight in the range of about 500 and about 50,000, said polycationic polymer having a molecular weight in the range of about 1,500 and 500,000, and the molar ratio of said polycationic polymer to said polyanionic polymer based on the average molecular weight of the repeating units therein being in the range of about 2:1 and about 25:1.

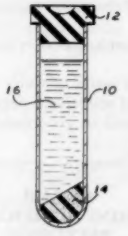
---

**4,147,628**

## BLOOD PARTITIONING METHOD

**Michael C. Bennett, Summit, N.J., and Suresh N. Mehta, Bombay, India, assignors to Becton, Dickinson and Company, Rutherford, N.J.**

**Filed Jan. 23, 1978, Ser. No. 871,551**
**Int. Cl.[2] B01D *21/00***
**U.S. Cl. 210—83** **3 Claims**




1. In the method of separating blood into its light, substantially liquid phase and its heavy, substantially cellular phase by providing a tubular blood collection container having disposed in its bottom an inert, flowable, gel-like barrier material; filling the container with blood; and centrifuging the blood filled container to effect separation of the phases and displacement of the barrier material to the interface between phases; the improvement which consists of

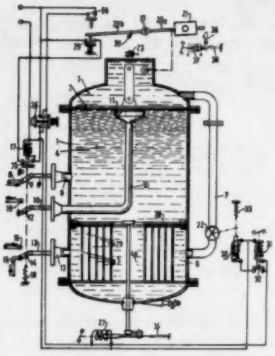
providing means to cause said gel-like barrier to make a complete sealing contact with the entire inner surface of the tubular container at a predetermined level thereof, said means consisting of a constriction in the bore thereof, positioned in the zone where the barrier material is calculated to come to rest during centrifugation, said constriction being integrally formed and fixed in the wall of the said container; whereby during centrifugation, the barrier material displaced makes sealing contact with said constriction and closes the bore in said zone, permanently isolating the liquid phase from the cellular phase without destruction of the tubular container.

4,147,629

## APPARATUSES TO SEPARATE A MIXTURE OF LIQUIDS OF DIFFERENT SPECIFIC GRAVITIES, E.G. OIL AND WATER

Alfonsus A. Geurtsen, Schalkhaar, Netherlands, assignor to Machinefabriek Geurtsen Deventer B.V., Deventer, Netherlands

Filed Jul. 21, 1977, Ser. No. 817,599
Claims priority, application Netherlands, Sep. 1, 1976, 7609743
Int. Cl.[2] B01D *23/02, 23/26*
U.S. Cl. 210—104 6 Claims



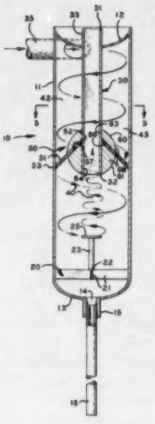
1. An apparatus to separate a mixture of liquids of different specific gravities, e.g. oil and water, said apparatus comprising a closed vessel, a separation space, an upper chamber situated above said space, said space and said chamber being both contained in the vessel, a diaphragm mounted for vertical movement between a lowest and a highest position for controlling at least the discharge of the lighter liquid, said diaphragm forming a liquid tight partition between the upper end of the separation space and the upper chamber, a conduit for the supply of mixture to be separated, said conduit opening into the separation space, a conduit for the discharge of the lighter liquid, the latter conduit having its entrance within the separation space on a level just below the lowest position of the diaphragm, a valve provided in said discharge conduit and being controlled by the diaphragm, said valve being open, when the diaphragm is in its highest position, and closed when the diaphragm is in its lowest position, a collecting chamber for the heavier liquid, said collecting chamber being contained in the vessel under the separation space, a conduit for the discharge of heavier liquid, the latter discharge conduit being connected to the collecting chamber, at least one filter provided in the vessel between the lower end of the separation space and the collecting chamber and capable of letting through almost exclusively the heavier liquid and retaining almost completely the lighter liquid, a pipe bridging the diaphragm and connecting the upper chamber with a place located in the vessel near or below the lower end of the separation space and communicating with the latter space, a second valve which is provided in the pipe bridging the diaphragm and means to control said second valve so as to close it immediately after the opening of the valve provided in the conduit for the discharge of lighter liquid from the separation space and to keep it closed a predetermined interval during the discharge of lighter liquid from the vessel.

4,147,630

## HYDRAULIC SEPARATING DEVICE WITH AUTOMATIC FLOW CONTROL

Claude C. Laval, Jr., 2444 North Farris Ave., Fresno, Calif. 93705

Filed Sep. 19, 1977, Ser. No. 834,408
Int. Cl.[2] B01D *21/26;* B04C *5/04*
U.S. Cl. 210—137 10 Claims



1. A separating device comprising:

A. an outer member having an elongated vortexing chamber circumscribed by an inner surface of revolution and having substantially closed upper and lower ends;

B. an elongated tubular inner member mounted in the upper end of the outer member substantially concentrically of the vortexing chamber circumscribed by an outer surface of revolution and with the inner surface of the outer member defining an annular passage therebetween, the inner member having an open end disposed within the vortexing chamber intermediate opposite ends thereof;

C. a fluid supply conduit connected tangentially to the vortexing chamber adjacent to the upper end of the outer member whereby fluid containing matter to be separated therefrom is delivered into the vortexing chamber, swirls about the inner member downwardly in the passage and the vortexing chamber to centrifuge matter therefrom from gravitational descent to the lower end of the outer member and the fluid thence swirls upwardly through the inner member;

D. means for removing matter that has settled to the lower end of the outer member;

E. a resiliently flexible circular flap; and

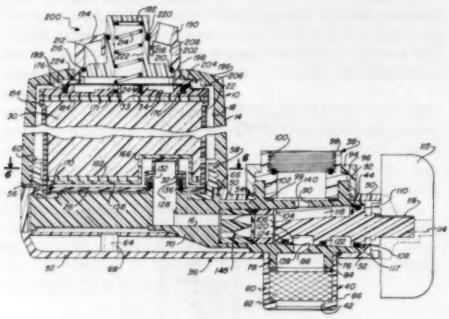
F. means mounting the flap in circumscribing relation on the inner member below the fluid supply conduit with the flap extended obliquely outwardly and downwardly from the inner member into the passage whereby the effective size of the passage is reduced when the volume of fluid flow is reduced by the flap moving outwardly toward the outer member to maintain fluid velocity for centrifuging purposes and the effective size of the passage is increased when the volume of fluid flow is increased forcing the flap inwardly from the outer member to accommodate the increased volume while maintaining fluid velocity for centrifuging purposes.

4,147,631

## WATER CONTROL AND DISTRIBUTION APPARATUS

Siegmund Deines, Ft. Collins; Gary L. Swiercinsky, Loveland, and Craig E. Engstrom, Ft. Collins, all of Colo., assignors to Teledyne Industries, Inc., Ft. Collins, Colo.

Filed Sep. 23, 1977, Ser. No. 836,155
Int. Cl.[2] B01D 27/02, . 5/02
U.S. Cl. 210—137 16 Claims



1. Water filter apparatus comprising:
a housing having a horizontally-disposed base unit;
a coupling upstanding from one end portion of said base unit and attachable to a faucet for receiving a supply of water;
an outlet downwardly directed from said base unit for discharging water received through said coupling;
a valve disposed within said base unit for selectively permitting the flow of water through said coupling and in discharge from said outlet;
an inverted cup-shaped cap removably secured to upstand from another portion of said base unit, said base unit including an input fluid channel leading from said valve to the chamber defined by said cap and said valve selectively permitting the flow of water through said coupling into said input fluid channel and thence into said chamber;
a filter cartridge disposed within said cap and enclosing a filtration material, said cartridge having an inlet opening communicating water from said input channel to said material and an outlet opening disposed within said cap for communicating water from said material and out of said cartridge;
a spigot located at the top of said cap for emitting water discharged from said outlet opening of said cartridge;
a control for regulating the flow of water from said outlet opening of said cartridge through said spigot;
means defining a second outlet downwardly directed from said base unit;
and means defining an arrangement in which said base unit, said cartridge and said cap permit discharge of water from said second outlet selectively by operation of said valve.

16. Water filter apparatus comprising:
a housing having a horizontally-disposed base unit;
a coupling upstanding from one end portion of said base unit and attachable to a faucet for receiving a supply of water;
an outlet downwardly directed from said base unit for discharging water received through said coupling;
a valve disposed within said base unit for selectively permitting the flow of water through said coupling and in discharge from said outlet;
an inverted cup-shaped cap removably secured to upstand from another portion of said base unit, said base unit including an input fluid channel leading from said valve to the chamber defined by said cap and said valve selectively permitting the flow of water through said coupling into said input fluid channel and thence into said chamber;
a filter cartridge disposed within said cap and enclosing a filtration material, said cartridge having an inlet opening communicating water from said input channel to said material and an outlet opening disposed within said cap for communicating water from said material and out of said cartridge;
and regulator means, including a variable orifice assembly disposed in said input fluid channel and responsive to increasing input fluid pressure for automatically diminishing the flow of water through said input fluid channel, for limiting the rate of water flow through said input fluid channel substantially to a predetermined maximum upon increase of incoming water pressure beyond a selected level.

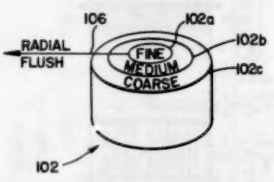
---

4,147,632

## AUGMENTING AND FACILITATING FLUSHING IN MAGNETIC SEPARATION

Robin R. Oder, Novato, Calif., assignor to J. M. Huber Corporation, Locust, N.J.

Division of Ser. No. 731,398, Oct. 12, 1976, Pat. No. 4,087,358.
This application Dec. 19, 1977, Ser. No. 861,787
Int. Cl.[2] B01D 35/06
U.S. Cl. 210—222 6 Claims




1. In a system for effecting the magnetic separation of magnetically attractable particles from a dispersion of such particles in a fluid carrier, said system being of the type including a non-magnetic cylindrical canister containing a ferromagnetic filamentations matrix therewithin and having inlet means at one end of said cylindrical canister and outlet means at the opposite end of said cylindrical canister; an electromagnetic coil surrounding said cylindrical canister for generating a magnetic field within said canister disposed in said field; means for flowing said dispersion axially through said matrix within said cylindrical canister from its inlet means to its outlet means and means for providing a flushing flow through said matrix to remove collected particles from the matrix to regenerate the same; the improvement comprising:
a filamentation matrix having gradiations in density provided by successive zones of uniform density, wherein said zones are consecutively overlying cylinders, defining in total the cylindrical matrix, with each zone being more dense than its successor in the axial direction of fluid flow provided by the means for flowing the fluid through the canister from its inlet means to its outlet means for effecting the magnetic separation of magnetically attractable particles from said dispersion and with each zone being less dense than its successor in the axial direction of flushing flow provided by means for flowing a fluid from said outlet to said inlet means of said canister to remove collected particles from the matrix to regenerate the same.

---

4,147,633

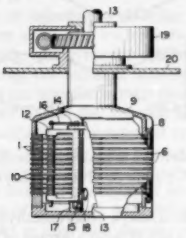
## STACKED FILTERING PLATES

Yoshiharu Kato, Tokyo, Japan, assignor to Ltd. Tesika, Tokyo, Japan

Filed Jun. 6, 1977, Ser. No. 803,982
Int. Cl.[2] B01D 29/42
U.S. Cl. 210—232 3 Claims

1. A filter which comprises:
a plurality of filtering plates stacked up one on top of another at fixed intervals including peripheral edges with perforations provided therein;
clamping bolts disposed within said perforations of said peripheral edges of said filtering plates; and,

scrapers disposed substantially within said filtering plates and within said fixed intervals wherein said filtering plates are provided with an increased wall thickness on one surface thereof around said perforations, engaging projections are provided on one surface of the portions of increased wall thickness and the other surface of said filtering plates include corresponding engaging recesses such that when said filtering plates are stacked up one on top of another said engaging projections of the filtering plates are disposed within said engaging recesses of adjacent filtering plates while, at the same time, the portions of the adjacent filtering plates having normal thickness form filtering spaces therebetween.



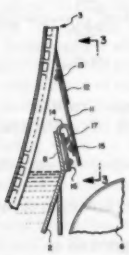
---

**4,147,634**

## DEFLECTOR BLADE FOR ROTARY DRUM FILTER

**Willi A. Wegener, Salt Lake City, Utah, assignor to Envirotech Corporation, Menlo Park, California**

**Filed Mar. 15, 1978, Ser. No. 886,838**
**Int. Cl.[2] B01D *33/36***
**U.S. Cl. 210—396** **2 Claims**



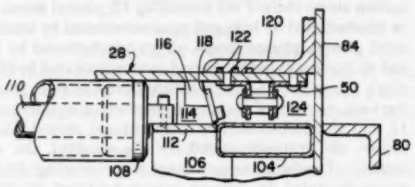
1. A deflector blade assembly on a vacuum filter of the type having a drum journalled for rotation in a tank, said assembly including a plurality of adjacent seaprate blade segments positioned side-by-side on the wall of said tank in position to deflect cake released from said drum to a location outside said tank each segment comprising a straight blade secured to at least two spaced apart U-shaped flat springs with the free edge of said blade extending an equal distance beyond the closed end of each of said U-shaped springs, means detachably securing said blade to said tank including complemental elements on the free end of said U-shaped spring and on said tank cooperating with each other to position said springs and thus said straight blade relative to the surface of said drum and to said adjacent blade segments.

**4,147,635**

## FILTER APPARATUS

**William D. Crowe, San Francisco, Calif., assignor to J. R. Schneider Co., Inc., Tiburon, Calif.**

**Continuation-in-part of Ser. No. 779,715, Mar. 21, 1977, abandoned. This application Jan. 11, 1978, Ser. No. 868,612**
**Int. Cl.[2] B01D *33/14***
**U.S. Cl. 210—401** **6 Claims**



1. A filter apparatus comprising:
a frame;
a continuous flexible and pervious conveyor belt comprised of relatively thin transverse plates fixed to a pair of continuous chains;
upper and lower spaced apart sprocket means on said frame for supporting said chains so that an inclined upper portion of said belt slopes upwardly;
side wall and end wall means forming a receiving tank for dirty liquid above said inclined upper portion of said belt and a collection tank for clean liquid below said inclined upper portion and under said receiving tank;
inclined belt support means fixed to said sidewall means;
means for feeding a layer of filter media onto said belt so that it can cover the upper surface of its said inclined upper portion;
sealing means around the periphery of said collection tank comprising elongated sealing members fixed to each said receiving tank side wall and spaced above said inclined belt support means to form side chambers for clean liquid and means for supplying clean liquid to said side chambers and to the lower end of said receiving tank at a pressure greater than the pressure of dirty liquid within said receiving tank, thereby preventing the migration of dirty liquid around the side edges of said belt into said collection tank;
suction means for reducing the pressure within and withdrawing clean liquid from said collection tank; and
drive means connected to said upper sprocket means for moving said conveyor belt and thus the media thereon forwardly and upwardly along said incline.

---

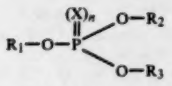
**4,147,636**

## FLAMEPROOFING COMPOSITIONS COMPRISING A TRIESTER OF PHOSPHOROUS PHOSPHORIC OR THIOPHOSPHORIC ACID AND A HALOALKYL ARYL ETHER

**William O. Drake, Therwil; Hans-Werner Finck; Horst Mayerhoefer, both of Oberwil, and Wolfgang H. Mueller, Neuallschwil, all of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland**

**Filed Jul. 22, 1977, Ser. No. 818,375**
**Claims priority, application Switzerland, Jul. 23, 1976, 9463/76; Apr. 27, 1977, 5217/77; May 11, 1977, 5890/77**
**Int. Cl.[2] C09K *3/28***
**U.S. Cl. 252—8.1** **34 Claims**

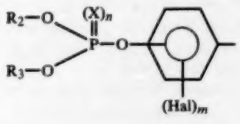
1. A flameproofing composition comprising:
(a) at least one compound of formula I,



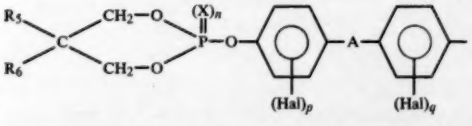
I

in which

$R_1$ is ($C_{1-18}$) alkyl; ($C_{5-8}$) cycloalkyl; unsubstituted phenyl; phenyl mono-, di- or trisubstituted by halo; phenyl mono-, di- or trisubstituted by ($C_{1-12}$) alkyl, the total number of carbon atoms thereof not exceeding **12**; phenyl mono-, di- or trisubstituted by halo and monosubstituted by unsubstituted phenyl; phenyl mono-, di- or trisubstituted by halo and monosubstituted by phenyl monosubstituted by ($C_{1-8}$) alkyl; phenyl mono-, di- or trisubstituted by ($C_{1-12}$) alkyl, the total number of carbon atoms thereof not exceeding **12**, and monosubstituted by unsubstituted phenyl; phenyl mono-, di- or trisubstituted by ($C_{1-12}$) alkyl, the total number of carbon atoms thereof not exceeding **12**, and monosubstituted by phenyl monosubstituted by ($C_{1-8}$) alkyl; phenyl monosubstituted by unsubstituted phenyl; phenyl monosubstituted by phenyl monosubstituted by ($C_{1-8}$) alkyl; unsubstituted phenyl-($C_{1-4}$) alkyl; phenyl-($C_{1-4}$) alkyl mono-, di- or trisubstituted by halo on the phenyl nucleus; phenyl-($C_{1-4}$) alkyl mono-, di- or trisubstituted by ($C_{1-12}$) alkyl on the phenyl nucleus, the total number of carbon atoms thereof not exceeding **12**; phenyl-($C_{1-4}$) alkyl mono-, di- or trisubstituted by halo on the phenyl nucleus and monosubstituted by unsubstituted phenyl on the phenyl nucleus; phenyl-($C_{1-4}$) alkyl mono-, di- or trisubstituted by halo on the phenyl nucleus and monosubstituted by phenyl monosubstituted by ($C_{1-8}$) alkyl, on the phenyl nucleus; phenyl-($C_{1-4}$) alkyl mono-, di- or trisubstituted by ($C_{1-12}$) alkyl on the phenyl nucleus, the total number of carbon atoms thereof not exceeding **12**, and monosubstituted by unsubstituted phenyl on the phenyl nucleus; phenyl-($C_{1-4}$) alkyl mono-, di- or trisubstituted by ($C_{1-12}$) alkyl on the phenyl nucleus, the total number of carbon atoms thereof not exceeding **12**, and monosubstituted by phenyl monosubstituted by ($C_{1-8}$) alkyl, on the phenyl nucleus; phenyl-($C_{1-4}$) alkyl monosubstituted by unsubstituted phenyl on the phenyl nucleus; phenyl-($C_{1-4}$) alkyl monosubstituted by phenyl monosubstituted by ($C_{1-8}$) alkyl, on the phenyl nucleus; or a group of formula (a) or (b),



(a)

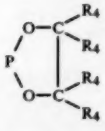


(b)

either $R_2$ has one of the significances of $R_1$,

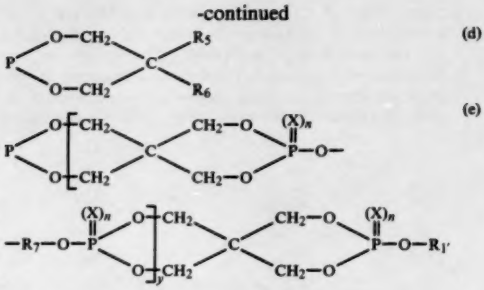
and $R_3$ has one of the significances of $R_1$,

or $R_2$ and $R_3$, or both sets of $R_2$ and $R_3$, as appropriate, form together with the oxygen atoms to which they are attached and the common phosphorus atom a radical of formula (c), (d), or (e),



(c)

-continued



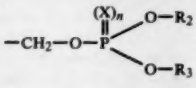
(d)

(e)

each $R_4$, independently, is hydrogen or ($C_{1-4}$) alkyl;

$R_5$ is hydrogen; ($C_{1-4}$)alkyl; chloromethyl; bromomethyl or phenyl;

$R_6$ is hydrogen; ($C_{1-4}$)alkyl; chloromethyl; bromomethyl or, when $R_5$ is ($C_{1-4}$)alkyl, also a group of formula (f),

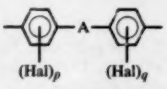


(f)

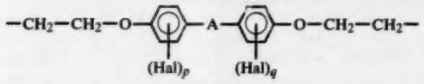
with the proviso that in any radical (d) formed by $R_2$ and $R_3$, the oxygen atoms and the phosphorus atom in the group (f), $R_6$ is only hydrogen, ($C_{1-4}$) alkyl, chloromethyl or bromomethyl;

$R_1'$ has one of the significances of $R_1$;

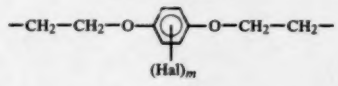
$R_7$ is straight or branched chain ($C_{2-22}$) alkylene; cyclohexylene; phenylene; ($C_{1-4}$)alkylene-1,4-phenylene-($C_{1-4}$) alkylene, or a group of formula (g), (h) or (i),



(g)



(h)



(i)

Y is zero or an integer 1 to 100;

A is a covalent bond; ($C_{1-4}$)alkylene;

—CH($C_6H_5$)—; —O—; —S— or —$SO_2$—;

each X, independently, is oxygen or sulphur;

n is zero or 1;

m is zero or an integer 1 to 4;

each p and each q, independently, is zero, 1 or 2;

and each Hal, independently, is chloro or bromo; with the provisos that: (i) at the most, only one of the groups (a) and (b) can be linked to any phosphorus atom via an oxygen atom; (ii) when y in a radical (e) is an integer 1 to 100, each of $R_1$ and $R_1'$, independently, can also signify a group —$R_7$OH; (iii) when an oxygen atom is attached to the phosphorus atom in any radical (d), including a radical (d) in any group (a) or (b), $R_5$ or $R_6$ in that radical (d) is other than alkyl, chloromethyl or bromomethyl when $R_6$ or $R_5$, respectively, therein is chloromethyl or bromomethyl; and (iv) at the most, only one radical (e) can be present per molecule; and (b) at least one haloalkyl aryl ether, the aryl ring(s) of

which is unsubstituted or substituted by 1 or more halo substituents.

4,147,637

## OIL RECOVERY BY INCREASING THE INJECTIVITY INDEX OF MICELLAR SYSTEMS CONTAINING CRUDE OIL SULFONATES

**Mark A. Plummer, and Stanley C. Jones, both of Littleton, Colo., assignors to Marathon Oil Company, Findlay, Ohio**

**Filed Sep. 2, 1977, Ser. No. 830,229**

**Int. Cl.[2] E21B *43/22***

**U.S. Cl. 252—8.55 D** **7 Claims**

1. In a process of injecting a micellar system comprising crude oil petroleum sulfonate, hydrocarbon and water into a hydrocarbon-bearing, subterranean formation via injection means and displacing the micellar system from the injection means and wherein the micellar system causes adverse injectivity problems due to wax in the micellar system the improvement comprising contacting the micellar system with about 0.5 to about 10 parts by weight of an extraction agent from the group consisting of paraffinic hydrocarbon or haloparaffin, having an average molecular weight of about 50 to about 200, per part by weight of sulfonate, permitting the resulting mixture to separate into at least two phases, separating the phase containing the wax and the paraffinic hydrocarbon or haloparaffin and thereafter injecting the extracted micellar system into the formation and displacing the hydrocarbon from the formation.

---

4,147,638

## SULFONATION OF CRUDE OILS TO PRODUCE PETROLEUM SULFONATES

**Mark A. Plummer, Littleton, Colo., assignor to Marathon Oil Company, Findlay, Ohio**

**Division of Ser. No. 376,657, Jul. 5, 1973. This application Jul. 6, 1976, Ser. No. 702,632**

**Int. Cl.[2] E21B *43/22***

**U.S. Cl. 252—8.55 D** **16 Claims**

1. A process for the secondary recovery of oil comprising in combination the steps of:

(a) forming a micellar dispersion comprising hydrocarbon, water, and petroleum sulfonate produced by a process comprising contacting sulfur trioxide with a hydrocarbon selected from the group consisting of whole crude oil, topped crude oil, and mixtures thereof in a reaction zone at a temperature of about 26.6° to about 121° C., at a pressure of about 0.01 to about 150 atmospheres, and for a reaction time of about 0.001 to about 3600 seconds wherein about 5 to about 30 pounds of sulfur trioxide are contacted with each 100 pounds of hydrocarbon and wherein unreacted hydrocarbon after said contact with sulfur trioxide is removed by extracting the product mixture resulting from said contact of sulfur trioxide with said hydrocarbon with an extracton solvent selected from the group consisting of low molecular weight alcohol, ketone, ether, benzene, toluene, water or mixtures thereof and thereafter neutralizing the product with sodium hydroxide, potassium hydroxide or ammonia,

(b) injecting at least a portion of said micellar dispersion into a petroleum-containing formation, and

(c) displacing said micellar dispersion through said petroleum-containing formation to displace petroleum.

---

4,147,639

## LUBRICANT FOR FORMING METALS AT ELEVATED TEMPERATURES

**D. William Lee, Concord; John L. O'Brien, Winchester, and Michael Rossetti, Woburn, all of Mass., assignors to Arthur D. Little, Inc., Cambridge, Mass.**

**Continuation-in-part of Ser. No. 660,465, Feb. 23, 1976, abandoned. This application Dec. 5, 1977, Ser. No. 857,313**

**Int. Cl.[2] C10M *1/10, 1/06, 3/02*; B21B *45/02***

**U.S. Cl. 252—25** **7 Claims**

1. A liquid coating composition for applying to a ferrous surface to serve as the precursor of a lubricant to be used during forming under pressure at an elevated temperature between about 1100° F. and 2300° F., characterized as being a slurry of a mixture consisting essentially of a source of boron oxide selected from the group consisting of boric acid and boric oxide and an alkali metal borate in a liquid vehicle which serves no lubricating function, said alkali metal borate being present in said mixture in an amount to provide between about 5 and about 10 mole percent of alkali metal oxide when said mixture is heated to form therefrom an alkali-modified borate glass which has a viscosity ranging between about 500 and about 1500 centipoises at said elevated temperature.

---

4,147,640

## LUBRICANT COMPOSITION

**Gerald J. J. Jayne, Wokingham, England; David R. Woods, Tavin Oranmore, Ireland, and Joseph P. O'Brien, Kirkwood, Mo., assignors to Edwin Cooper and Company Limited, Bracknell, England**

**Filed Aug. 17, 1977, Ser. No. 825,252**

**Claims priority, application United Kingdom, Sep. 24, 1976, 39822/76**

**Int. Cl.[2] C10M *1/38, 3/32*; C07G *17/00*; C09B *49/00***

**U.S. Cl. 252—45** **24 Claims**

1. A lubricating oil additive prepared by the process comprising:

(A) in a first stage reacting at about 50°–160° C. about one mole of a first reactive olefinically unsaturated hydrocarbon containing about 6–18 carbon atoms and 1–3 olefinic double bonds with about 0.1–5 moles of elemental sulfur and about 0.1–1 moles of added hydrogen sulfide to obtain an intermediate, and

(B) in a second stage reacting at about 100°–210° C. said intermediate with about 0.2–1 moles of a second reactive olefinically unsaturated hydrocarbon containing about 6–18 carbon atoms and 1–3 olefinic double bonds, said second olefinically unsaturated hydrocarbon being the same or different from said first olefinically unsaturated hydrocarbon, to obtain an oil soluble lubricating oil additive.

18. A lubricating oil composition comprising a major amount of a lubricating oil and a minor amount sufficient to impart antioxidant properties of an additive of claim 1.

---

4,147,641

## MULTIPURPOSE HYDROCARBON FUEL AND LUBRICATING OIL ADDITIVE MIXTURE

**Warren H. Machleder, Blue Bell, and Joseph M. Bollinger, North Wales, both of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.**

**Continuation-in-part of Ser. No. 671,461, Mar. 29, 1976, abandoned, which is a continuation-in-part of Ser. No. 536,075, Dec. 24, 1974, abandoned. This application Jul. 5, 1977, Ser. No. 813,026**

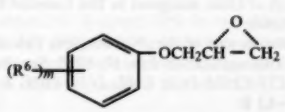
**The portion of the term of this patent subsequent to Sep. 13, 1994, has been disclaimed.**

**Int. Cl.[2] C10M *1/32***

**U.S. Cl. 252—51.5 A** **28 Claims**

1. A composition comprising a blend of (A) a major proportion of a hydrocarbon fuel, a lubricating oil, or a mixture of a hydrocarbon fuel and a lubricating oil, and (B) a minor detergent amount of a multipurpose additive comprising a mixture of:

(1) the reaction product of (a) a glycidyl ether compound of the formula



where $R^6$ is an aliphatic hydrocarbon group having at least 8 carbon atoms and m is 1–3, and (b) an amine having at least

one amino group having at least one active hydrogen atom; and

(2) a polycarboxylic acid ester wherein the ester group is the residue of a $C_1$–$C_{20}$ alkanol, an alkyl phenoxy polyethoxy ethanol, or the mixed residue of said alkanol and said ethanol.

**26**. A composition comprising a major proportion of gasoline, and a minor amount of the additive of claim **1** in amounts of said reaction product (1) of about 20–300 ppm and said polycarboxylic acid ester (2) of about 100–650 ppm.

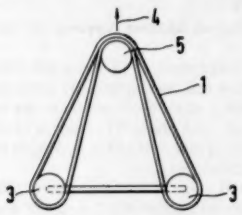
---

**4,147,642**

## METHOD AND APPARATUS FOR THE RENEWAL OF THE TREAD OF A WORN PNEUMATIC OR SOLID RUBBER TIRE

**Wilhelm Schelkmann, Witten, Fed. Rep. of Germany, assignor to Vakuum Vulk Holding Limited, Nassau, The Bahamas**

**Filed May 27, 1977, Ser. No. 801,411**
**Int. Cl.**[2] **B29H** *17/37, 17/38*
**U.S. Cl. 156—96** **8 Claims**




**1**. A method of renewal of the tread of a worn pneumatic or solid rubber tire comprising the steps of:

applying a layer of bonding rubber to the exterior of a prepared tire body,

imparting a very hard stretch to a prefabricated precured rubber tread ring to such an amount that its inner diameter will be much greater than the diameter of the tire body to which it is to be applied and the tread rubber plastically deforms longitudinally to an extent that upon being freed from the stretching forces the tread rubber will gradually reduce longitudinally down to a point of retaining a residual permanent stretch,

freeing said tread ring from the forces employed in imparting said stretch,

placing the freed previously stretched tread ring over the tire body while the tread ring that was very hard stretched to a large diameter retains temporarily an inner diameter greater than and in the range of the diameter of the tire body,

leading away gaseous inclusions between said tire body and said tread ring, and

heating the assembly of said tire body and said tread ring to vulcanize said layer of bonding rubber between said tire body and said tread ring.

---

**4,147,643**

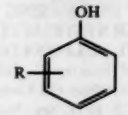
## ORGANIC COMPOSITIONS USEFUL AS ADDITIVES FOR FUELS AND LUBRICANTS

**John F. Pindar, Euclid, and Jerome M. Cohen, University Heights, both of Ohio, assignors to The Lubrizol Corporation, Wickliffe, Ohio**

**Continuation-in-part of Ser. No. 661,906, Feb. 26, 1976, abandoned. This application Jun. 17, 1976, Ser. No. 697,177**
**Int. Cl.**[2] **C10M** *1/20;* **C10L** *1/18;* **C08G** *8/04*
**U.S. Cl. 252—52 R** **4 Claims**

**1**. A composition of matter made by reacting

(A) at least one mono-substituted phenol represented by the formula




wherein R is a purely hydrocarbyl substituent having an average of about 50 to about 300 carbon atoms; with

(B) formaldehyde or reactive equivalent thereof; and

(C) phenol, $C_6H_5OH$.

---

**4,147,644**

## COLLECTOR COMBINATION FOR NON-SULFIDE ORES

**Samuel S. Wang, Cheshire; Eugene L. Smith, Jr., and Ernie F. Huliganga, both of Milford, all of Conn., assignors to American Cyanamid Company, Stamford, Conn.**

**Filed Dec. 21, 1977, Ser. No. 863,035**
**Int. Cl.**[2] **B03D** *1/02;* **C09K** *3/00*
**U.S. Cl. 252—61** **10 Claims**

**1**. A collector combination for non-sulfide ores comprising from about 70.0 to about 99.9 weight percent of a fatty acid derived from a vegetable or animal oil and, correspondingly from about 30.0 to about 0.1 weight percent of an anionic perfluoroalkyl compound of the general formula

$$CF_3—CF_2)_m(CH_2)_nY—X$$

wherein Y is $—COO^-$ or $—SO_3^-$, X is a hydrogen, alkali metal, or ammonium ion, m is an integer of about 4 to 8, and n is 0 or 1.

---

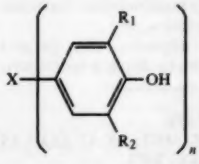
**4,147,645**

## ELECTROGRAPHIC FLASH FUSING TONERS

**Chin H. Lu, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

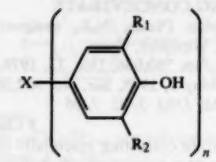
**Filed Dec. 23, 1977, Ser. No. 864,053**
**Int. Cl.**[2] **G03G** *9/08*
**U.S. Cl. 252—62.1 P** **18 Claims**

**1**. A toner composition for use in flash fusing electrophotographic imaging systems comprised of a resin and an additive of a sterically hindered phenol of the formula:




wherein $R_1$ and $R_2$ are independently selected from the group consisting of aliphatic radicals, X is selected from the group consisting of hydrocarbons, carboxylic ester and phosphonate, phosphate, sulfate, sulfonate and nitrate radicals, and n is a number from 1 to about 4.

**11**. A method of imaging comprising forming an electrostatic latent image contacting the image with a toner comprising an additive of a sterically hindered phenol of the formula:



wherein $R_1$ and $R_2$ are independently selected from the group consisting of aliphatic radicals, X is selected from the group consisting of hydrocarbons, carboxylic ester and phosphonate, phosphate, sulfate, sulfonate and nitrate radicals and n is a number from 1 to about 4 and subsequently transferring the image to a substrate, followed by fixing said image using a flash fusing device.

---

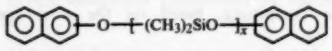
**4,147,646**

## CAPACITOR CONTAINING A NAPHTHOXY SUBSTITUTED DIMETHYLSILOXANE DIELECTRIC FLUID

**Gerald R. Cappo, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.**

**Filed Sep. 26, 1977, Ser. No. 836,448**
**Int. Cl.² H01B 3/46**
**U.S. Cl. 252—63.7** **5 Claims**

1. A capacitor containing a dielectric fluid which is a naphthoxy substituted dimethylsiloxane having a viscosity of less than about 50 centistokes at 25° C., said dielectric fluid having the general formula



wherein x has an average value ranging from about 6 to about 15.

---

**4,147,647**

## SCALE CONVERTERS

**Richard L. Rybacki, St. Ann, Mo., assignor to Petrolite Corporation, St. Louis, Mo.**

**Filed Oct. 15, 1973, Ser. No. 406,543**
**Int. Cl.² C02B 5/06; C09K 7/02**
**U.S. Cl. 252—82** **10 Claims**

1. A process for dissolving gypsum containing scale which comprises contacting the scale with a water soluble alkali metal maleate salt as a scale converter in an aqueous system having a pH of 7.5 to 12.0.

4. A solution for converting gypsum containing scale to a soluble form comprising an aqueous solution of a water soluble alkali metal maleate salt scale converter and a wetting agent which assists in wetting the scale and having a pH of 7.5 to 12.0.

---

**4,147,648**

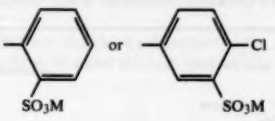
## BRIGHTENING COMPOSITIONS

**Franz Günter, Riehen, Switzerland, and Claude Eckhardt, Riedisheim, France, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Filed Jun. 27, 1977, Ser. No. 810,534**
**Claims priority, application Switzerland, Jul. 9, 1976, 8830/76**
**Int. Cl.² C11D 3/42, 9/44**
**U.S. Cl. 252—89 B** **6 Claims**

1. A brightening composition consisting of a mixture of brighteners and 0 to 99,995% by weight of a conventional washing agent, said mixture consisting of at least two brighteners of the formula

in which A and B independently of one another denote a radical of the formula



in which M represents hydrogen or an ammonium, alkaline earth metal, amine salt or alkali metal ion and wherein said brighteners are in a ratio of 1:9 to 9:1 in case A and B are the same and in a ratio of 1:1:2 to 2.8:2.8:1 in case A and B are different.

---

**4,147,649**

## LIQUID DETERGENT COMPOSITION

**Jose L. Arnau, Wemmel; Christian R. Barrat, Meise, and Jean Wevers, Brussels, all of Belgium, assignors to The Procter & Gamble Company, Cincinnati, Ohio**

**Filed Dec. 22, 1976, Ser. No. 753,349**
**Claims priority, application United Kingdom, Jan. 2, 1976, 00057/76**
**Int. Cl.² C11D 1/83**
**U.S. Cl. 252—89 R** **1 Claim**

1. A liquid, stable, concentrated, essentially homogeneous heavy duty detergent composition consisting essentially of:

(1) from about 35% to about 65% by weight of a mixture of:

(A) a nonionic surfactant having the formula

$$R_1O—(C_2H_4O)_x—H$$

wherein $R_1$ represents a hydrocarbyl group derived from a primary hydrocarbon monohydric alcohol of at least 70% branched-chain structure having from about 16 to about 19 carbon atoms, and x is a number of from about 9 to about 13;

(B) a nonionic surfactant having the formula

$$R_2O—(C_2H_4O)_y—H$$

wherein $R_2$ is a hydrocarbyl group derived from a primary or secondary, straight or branched aliphatic alcohol of at least 40% branched-chain structure having from about 12 to about 15 carbon atoms, and y is a number from about 3 to about 6;

wherein the weight ratio of (A) to (B) is from about 5:1 to about 2:1;

(C) a triethanolamine salt of an alkylbenzene sulfonic acid having on average about 12 carbon atoms in the alkyl group;

wherein the weight ratio of (A) + (B) to (C) is from about 4:1 to about 2:1;

(2) from about 3% to about 15% by weight of a liquid organic carrier selected from the group consisting of: ethanol; n-propanol; iso-propanol; alkali-metal salts and ethanolamine salts of cumene sulfonic acid; and mixtures thereof;

(3) a silicone suds-controlling agent in an amount from 0.01% to 0.2% by weight; and

(4) water.

4,147,650

## SLURRIED DETERGENT AND METHOD

Philip M. Sabatelli, Cincinnati, and Denny E. Daugherty, West Chester, both of Ohio, assignors to Chemed Corporation, Cincinnati, Ohio

Continuation of Ser. No. 660,588, Feb. 23, 1976, abandoned. This application Oct. 25, 1977, Ser. No. 844,558

Int. Cl.[2] C11D *7/56, 7/16*

U.S. Cl. 252—103 2 Claims

1. A slurry detergent composition consisting essentially of:

| | Solids, dry basis Wt. % |
|---|---|
| Water | 50–70 |
| Sodium or potassium hydroxide | 5–15 |
| Sodium or potassium metasilicate, anhydrous | 0–10 |
| Sodium or potassium silicate (20%), 1:2.50 ratio | 0–4 |
| Sodium hypochlorite | 0–3.0 |
| Sodium tripolyphosphate | 15–25 |
| Sodium polyacrylate, avg. mol. wt. 85,000–95,000 | 1.0–2.0 |

4,147,651

## BIPHENYL BASED LIQUID CRYSTAL COMPOSITIONS

Chan S. Oh, Diamond Bar, Calif., assignor to Beckman Instruments, Inc., Fullerton, Calif.

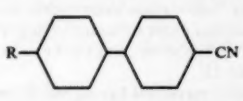
Filed Sep. 3, 1974, Ser. No. 502,659

The portion of the term of this patent subsequent to Apr. 11, 1995, has been disclaimed.

Int. Cl.[2] C09K *3/34;* G02F *1/13*

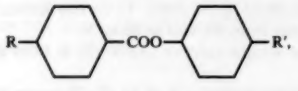
U.S. Cl. 252—299 10 Claims

1. Nematic liquid crystals having biphenyl liquid crystal dominant electro-optic characteristics and a wide nematic phase temperature range including ambient temperature actuatable in a 12.5 micron thick twisted nematic liquid crystal display cell by an actuation voltage of less than about 3.5 Vrms comprising one or more compounds selected from 4'-substituted-4-cyanobiphenyl liquid crystals having the formula

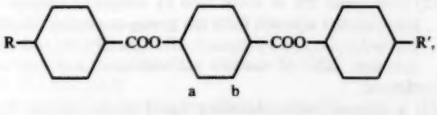


wherein r is a 1 to 9 carbon alkyl or alkoxy group, blended with one or more compatible 4,4'-disubstituted phenyl benzoate liquid crystals selected from the group consisting of:

compounds having the formula



wherein one of R and R' is methoxy and R the other of and R' is 1 to 7 carbon atom alkyl or alkoxy groups; and compounds having the formula



wherein R and R' are 1 to 7 carbon alkyl groups, a or b being chlorine, and the other of a or b being hydrogen.

4,147,652

## LIQUID CLEANING CONCENTRATE

Thaddeus J. Kaniecki, Pompton Plains, N.J., assignor to Stauffer Chemical Company, Westport, Conn.

Continuation-in-part of Ser. No. 750,036, Dec. 13, 1976, abandoned. This application May 3, 1978, Ser. No. 902,301

Int. Cl.[2] C11D *1/68, 1/83, 3/02, 7/06*

U.S. Cl. 252—156 3 Claims

1. A liquid cleaning concentrate consisting essentially of:

(a) from about 10% to about 35% by weight of alkali metal hydroxide;

(b) from about 0% to about 50% by weight of a non-ionic surfactant containing a polyoxyethylene group;

(c) from about 0% to about 50% by weight of an alkyl glucoside or a glycidyl ether of an alcohol having 12 to 24 carbon atoms or an alkyl phenol;

(d) the balance being water;

with the proviso that the total of the nonionic surfactant and the alkyl glucoside or glycidyl ether be in the range of about 10% to about 50% by weight.

4,147,653

## STORABLE MIXTURES CONTAINING AROMATIC ISOCYANATOSULPHONIC ACIDS

Dieter Dieterich, Leverkusen, Fed. Rep. of Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Oct. 14, 1977, Ser. No. 842,428

Claims priority, application Fed. Rep. of Germany, Oct. 30, 1976, 2650172

Int. Cl.[2] C07C *119/042;* C08G *18/79*

U.S. Cl. 252—182 4 Claims

1. A storable mixture in the form of a solution or solution-suspension comprising, based on the total quantity of (a)+(b)+(c):

(a) from 10 to 80 percent by weight of aromatic isocyanatosulphonic acids;

(b) from 20 to 90 percent by weight of a liquid ester of an inorganic or organic acid of phosphorus, which ester represents a solvent for the aromatic isocyanatosulphonic acids;

(c) from 0 to 70 percent by weight of non-sulphonated organic polyisocyanates.

4,147,654

## N-ACETYL DIGLYCOLIMIDE, AND ITS USE AS A BLEACH ACTIVATOR

John N. Rapko, St. Louis, Mo., assignor to Monsanto Company, St. Louis, Mo.

Division of Ser. No. 830,250, Sep. 2, 1977, Pat. No. 4,118,568. This application May 8, 1978, Ser. No. 904,065

Int. Cl.[2] C07D *265/32;* C11D *3/395, 7/54*

U.S. Cl. 252—186 2 Claims

1. A composition comprising N-acetyldiglycolimide and $H_2O_2$ or a peroxide compound which forms $H_2O_2$ in aqueous solution in which the molar ratio of the N-acetyldiglycolimide to the $H_2O_2$ or peroxide compound is from 0.1 to 10.

4,147,655

## LIQUID CRYSTALS WITH IMPROVED PROPERTIES AND DEVICES USING SUCH LIQUID CRYSTALS

Jean-Claude Dubois; Huu T. Nguyen, and Annie Zann, all of Paris, France, assignors to Thomson-CSF, Paris, France

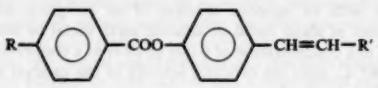
Filed Jan. 9, 1978, Ser. No. 868,092

Claims priority, application France, Jan. 14, 1977, 77 01068

Int. Cl.[2] C09K *3/34;* G02F *1/13;* C07C *69/78, 69/76, 69/62*

U.S. Cl. 252—299 5 Claims

1. A liquid crystal compound of the formula:



wherein:

R is $-OC_nH_{2n+1}$ or supressing $C_nH_{2n+1}$ and n is an integer from 1 to 10;

R' is alkyl of 1 to 10 carbon atoms.

3. A mixture containing at least two compounds of claim 1.

---

**4,147,656**

## MIXTURES OF NEMATIC LIQUID CRYSTAL MATERIALS

**Ralph E. Aldrich, Acton; William J. Cumming, North Chelmsford, both of Mass., and William A. Simmons, Jr., Houston, Tex., assignors to Itek Corporation, Lexington, Mass.**

**Continuation-in-part of Ser. No. 700,354, Jun. 28, 1976, Pat. No. 4,090,975, which is a continuation-in-part of Ser. No. 519,970, Nov. 1, 1974, abandoned, and Ser. No. 519,971, Nov. 1, 1974, abandoned. This application Apr. 27, 1978, Ser. No. 900,469**

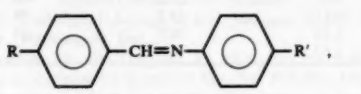
**Int. Cl.[2] C09K *3/34*; G02F *1/13***

**U.S. Cl. 252—299** **1 Claim**

1. A nematic liquid crystal composition having a freezing point at which said composition changes from a nematic liquid phase to a solid phase of at most about −50° C. and an isotropic transition point of at least about 80° C. which, based upon 100% by weight, consists essentially of:

a. from about 10% to about 15% by weight of bis(4'-n-octyloxybenzal)-2-chloro-1,4-phenylenediamine;

b. from about 25% to about 65% of a Schiff's base nematic liquid crystal compound represented by the structural formula,



wherein R is selected from the group consisting of $C_1$–$C_8$ alkoxy and $C_1$–$C_8$ alkyl ester and R' is selected from the group consisting of $C_1$–$C_8$ alkyl and $C_1$–$C_8$ alkyl ester; and,

c. from about 20% to about 65% Licristal 9, a mixture having a composition consisting essentially of the following ingredients, based upon 100%, by weight:

| | |
|---|---|
| 4'-n-pentylphenyl ester of anisic acid | 55–60% |
| 4'-n-pentylphenyl ester of 4-hexyloxybenzoic acid | 25–30% |
| (2'-cyano-4'butylphenyl)ester of 4-(4-hexanoyloxybenzoyloxy)-benzoic acid | 10–15%. |

---

**4,147,657**

## MIXING REACTIVE LIQUIDS AND PREPARING COAGULANT AIDS

**Robert J. Kovanda, Westmont, Ill.; Serge Maliar, Jr., Holmes, and Robert W. Spencer, Wallingford, both of Pa., assignors to PQ Corporation, Valley Forge, Pa.**

**Continuation-in-part of Ser. No. 748,347, Dec. 7, 1976, abandoned. This application Aug. 3, 1977, Ser. No. 821,372**

**Int. Cl.[2] B01J *13/00***

**U.S. Cl. 252—313 S** **22 Claims**

1. A process for preparing sodium metallo silicate dispersions useful as coagulant aids, comprising the steps of:

(a) providing a mixing block, comprising:

(1) a cylindrical chamber formed in a solid block, the initial portion of said chamber is partitioned to form separate chambers through which fluids can flow;

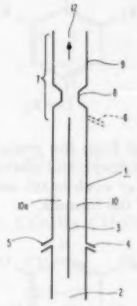
(2) an inlet for introducing fluid into the mixing block so that it flows through both of said separate chambers and said cylindrical chamber;

(3) inlets formed in said solid block intersecting said separate chambers;

(4) a mixing area formed by that portion of the chamber subsequent to the separate chambers, a constriction of said chamber and a subsequent chamber of full diameter; and

(5) an outlet from the block subsequent to the mixing area;

(b) providing flow of water through said mixing block utilizing the inlet of (a) (2) above, whereby flowing streams are formed in said separate chambers;



(c) injecting sodium silicate into one of said inlets intersecting one of said separate chambers, forming a flowing stream of dilute silicate in one of said separate chambers;

(d) injecting a metal salt solution into said second inlet intersecting the other of said separate chambers, thereby forming a flowing stream of dilute metal salt solution in a second separate chamber;

(e) mixing the streams of dilute metal salt and dilute sodium silicate by allowing them to flow into said mixing area; and

(f) recovering the desired sodium metallo silicate dispersion from the outlet.

---

**4,147,658**

## COMPOSITION FOR RETARDING THE EVAPORATION OF WATER

**Robert E. Savoit, Wappingers Falls, and Clemence J. Henry, Newburgh, both of N.Y., assignors to Texaco Inc., New York, N.Y.**

**Division of Ser. No. 815,395, Jul. 13, 1977, Pat. No. 4,099,915. This application Mar. 24, 1978, Ser. No. 889,753**

**Int. Cl.[2] B01J *1/18***

**U.S. Cl. 252—384** **5 Claims**

1. A composition for suppressing and/or retarding the evaporation of water agitated by partially air-exposed rotary surfaces comprising from 99.5 to 99.9 weight percent of a light lubricating oil; 0.1 to 0.5 weight percent of an alkaline earth metal sulfonates having two alkyl groups of from 6 to 16 carbon atoms attached to an aromatic group in a symmetrical manner, and 30 to 150 parts per million of an acrylic defoaming agent.

## 4,147,659
## NOVEL ANTIOXIDANT COMPOSITION AND PROCESS FOR MAKING THE SAME

Cornelis R. H. De Jonge, De Steeg, and Egenius A. Giezen, Rheden, both of Netherlands, assignors to Akzona Incorporated, Asheville, N.C.

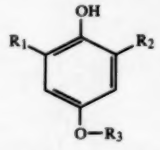
Division of Ser. No. 729,497, Oct. 4, 1976. This application May 5, 1978, Ser. No. 903,262

Claims priority, application Netherlands, Oct. 4, 1975, 7511698

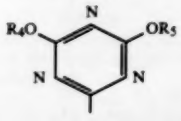
Int. Cl.[2] C09K *15/08, 15/14, 15/30*

U.S. Cl. 252—400 A 5 Claims

1. A composition comprising a compound of the formula,



wherein $R_1$ is selected from the group consisting of tertiary butyl, isopropyl, cyclohexyl, and phenyl, $R_2$ is selected from the group consisting of cyclohexyl and phenyl, and $R_3$ is a substituted triazine of the formula,



wherein $R_4$ and $R_5$ independently are selected from the group consisting of alkyl groups containing 8 to 20 carbon atoms and a secondary antioxidant selected from the group consisting of $\beta$-activated thio ethers, phosphites, and thiophosphites.

## 4,147,660
## METHOD FOR REACTIVATION OF PLATINUM GROUP METAL CATALYST WITH AQUEOUS ALKALINE AND/OR REDUCING SOLUTIONS

Kiaki Yamauchi; Yukihiko Morimoto; Toshikatu Sasaki, and Katsumi Nakai, all of Osaka, Japan, assignors to Osaka Gas Company, Ltd., Osakashi, Japan

Filed Dec. 16, 1977, Ser. No. 861,512

Claims priority, application Japan, Dec. 22, 1976, 51/155512; Feb. 15, 1977, 52/15635

Int. Cl.[2] B01J *23/96;* C01B *2/16;* C07C *1/02;* C10G *13/10*

U.S. Cl. 252—412 11 Claims

1. A method for reactivation of a platinum group metal catalyst which comprises contacting a platinum group metal catalyst lowered in the catalytic activity as the result of having been used for steam-reforming of hydrocarbons or alkanols with an aqueous solution of an inorganic alkaline compound of alkali metal or alkaline earth metal or mixtures thereof in a concentration of 0.001 to 10 N at a temperature of 5° to 250° C. until the catalytic activity of the catalyst is substantially recovered.

6. A method for reactivation of a platinum group metal catalyst which comprises contacting a platinum group metal catalyst lowered in the catalytic activity as the result of having been used for steam-reforming of hydrocarbons or alkanols with an aqueous solution of a reducing substance in a concentration of 0.01 to 10% by weight at a temperature of 5° to 250° C. until the catalytic activity of the catalyst is substantially recovered.

11. A method for reactivation of a platinum group metal catalyst which comprises contacting a platinum group metal catalyst lowered in the catalytic activity as the result of having been used for steam-reforming of hydrocarbons or alkanols with an aqueous solution or a reducing substance in a concentration of 0.01 to 10% by weight at a temperature of 5° to 250° C. for a period of 3 minutes to 80 hours and then treating the catalyst with an aqueous solution of an inorganic alkaline compound of alkali metal or alkaline earth metal or mixtures thereof in a concentration of 0.001 to 10 N at a temperature of 5° to 240° C. until the catalytic activity of the catalyst is substantially recovered.

## 4,147,661
## PRODUCTION OF MALEIC ANHYDRIDE AND CATALYSTS THEREFOR

Raymond Higgins, and Graham J. Hutchings, both of Middlesbrough, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Nov. 4, 1977, Ser. No. 848,719

Claims priority, application United Kingdom, Nov. 11, 1976, 46966/76

Int. Cl.[2] B01J *27/14;* C07D *307/60*

U.S. Cl. 252—435 6 Claims

1. A catalyst for the production of maleic anhydride by the oxidation of a hydrocarbon, which comprises a phosphorus/-vanadium mixed oxide with at least one promoter selected from the group consisting of tungsten, antimony, niobium, and molybdenum, the atomic ratio of vanadium to phosphorus being in the range 0.5:1 to 2:1 and the total atomic ratio of molybdenum, tungsten, antimony or niobium to vanadium being in the range 0.025:1 to 1:1, the surface area of the catalyst being at least 10 $m^2/g$, wherein said catalyst comprises a phase having a characteristic powder x-ray diffraction pattern using copper K$\alpha$-radiation as follows:

| | Line position | |
|---|---|---|
| d (Angstrom | 2.0 degrees | Intensity, I |
| 6.3 | 14.2 | 10 |
| 4.8 | 18.5 | 7 |
| 3.9 | 23.0 | 100 |
| 3.13 | 28.5 | 58 |
| 2.98 | 30.0 | 29 |
| 2.65 | 33.8 | 7 |

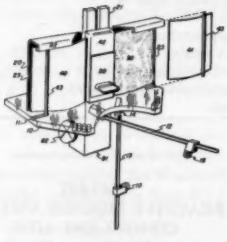
## 4,147,662
## FILM HOLDER

Robert Schwartz, 1271 Westfield Ave., Rahway, N.J. 07090

Continuation-in-part of Ser. No. 725,678, Sep. 22, 1976, abandoned. This application Sep. 9, 1977, Ser. No. 831,971

Int. Cl.[2] G03B *41/16;* A61B *6/04, 6/14*

U.S. Cl. 250—444 4 Claims



1. An apparatus for producing in conjunction with and independent x-ray camera a panoramic x-ray photograph of dental arches on a photographic plate which comprises:

(a) a base member having an upper and lower surface;

(b) a planar photographic plate holder assembly perpendicularly affixed to the upper surface of said base member, the frontal portion of said holder assembly adapted to permit the exposure of a photographic plate positioned within said holder assembly;

(c) a sectional overlapping shield assembly adapted to engage said holder assembly to cover a photographic plate positioned within said holder assembly to prevent the x-ray exposure of said photographic plate comprising at least one central shield member and said arch shield members located on each side of said central shield member;

(d) means on said base member to alternatively position each of said side arch shield members and a photographic plate supported thereby in a non-shielded arch corresponding to the facial contour of a patient facing the holder assembly;

(e) a positioning member located on said apparatus adapted to locate the upper and lower arches of said patient in a position facing and congruent with the frontal portion of said plate holder assembly;

(f) means on said base member to locate said x-ray camera in photographing position and comprising left and right elongated aiming bars having their inner ends pivotably affixed to the lower surface of said base member, said aiming bars, in the rest position, extending downwardly from said base member, each of said aiming bars adapted to be swung upwardly from the rest position to a stop position, each of said aiming bars, at said stop position, forming an angle of about 15° below the horizontal and an angle of about 40° to 60° with an imaginary vertical plane bisecting said central shield member; and

(g) aiming bar locator means located on the cone of said x-ray camera and adopted to engage a portion of said aiming bar when said aimming bar is in the stop position to thereby orient the longitudinal axis of said cone substantially parallel to the longitudinal axis of said aiming bar.

---

## 4,147,663
## OXIDATIVE COUPLING OF ALKYLPHENOLS, ALKOXYPHENOLS AND NAPHTHOLS CATALYZED BY METAL COMPLEXES OF AMINO CARBOXYLIC AND AMINO SULFONIC ACIDS

**Thomas F. Rutledge, Wilmington, Del., assignor to ICI Americas Inc., Wilmington, Del.**

**Division of Ser. No. 666,228, Mar. 12, 1976, Pat. No. 4,067,890, which is a continuation-in-part of Ser. No. 550,860, Feb. 18, 1975, abandoned, which is a continuation-in-part of Ser. No. 500,210, Aug. 23, 1974, abandoned. This application Oct. 31, 1977, Ser. No. 846,812**

**Int. Cl.[2] B01J** *31/04, 31/22, 31/26*

**U.S. Cl. 252—428** **5 Claims**

1. A catalyst composition comprising:

(a) a metal complex of an aminocarboxylic acid or an aminosulfonic acid wherein the metal is selected from the group consisting of cupric, cobaltous, manganous and nickelous ions, said metal complex being the product obtained by reacting a source of the metal ion with an aminocarboxylic or an aminosulfonic acid, and

alkaline material selected from the group consisting of alkali metal hydroxides, alkali metal carbonates and alkali metal bicarbonates.

---

## 4,147,664
## CATALYST OF POLYMERIZATION, COPOLYMERIZATION AND OLIGOMERIZATION OF OLEFINS AND DROLEFINS

**Anatoly D. Pomogailo, ulitsa Pervaya, 21; Alla P. Lisitskaya, ulitsa Pervaya, 2, kv. 27; Viktor S. Oskin, ulitsa Pervaya, 1, kv. 6; Fridrikh S. Dyachkovsky, ulitsa Tretya, 2, kv. 2; Ardalion N. Ponomarev, ulitsa Tretya, 2, kv. 3, and Nina S. Gorkova, ulitsa Pervaya, 24, kv. 19, all of Moskovskaya oblast, Noginsky raion, Chernogolovka, U.S.S.R.**

**Continuation of Ser. No. 625,516, Oct. 24, 1975, abandoned. This application May 12, 1977, Ser. No. 796,480**

**Int. Cl.[2] C08F** *4/02*

**U.S. Cl. 252—429 B** **26 Claims**

1. A catalyst of polymerization, copolymerization and oligomerization of olefins and diolefins, which is one of the following components: component A having the general formula $MX_n$ wherein M is a metal belonging to IVA-VIA groups of the Periodic System or cobalt, X is a halogen, hydrogen, cyclopentadienyl, alkoxy-, aryloxy- or amide group, and n is an integer denoting the valency of M; component B which is an organometallic compound having the general formula $M'R_pZ_{k-p}$ wherein M' is a metal belonging to I - III groups of the Periodic System, R is a hydrocarbon radical, z is a halogen, hydrogen, alkoxy-, aryloxy- or amide group, and k is an integer denoting the valency of M', $1 \leqq p \leqq k$; and component C which is a product having the general formula $MR_mX_{n-m}$, wherein n is an integer, $2 \leqq m \leqq n$, said component being chemically bonded to the surface of one of the fragments of the carbon-chain polymer carrier having grafted thereto substituents having the formula

wherein:

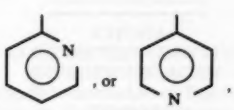
R' = H, $CH_3$, $C_2H_5$, $CH_2 = CH$, or $C_6H_5$;

R'' = H, or $CH_3$;

R''' = H, or $CH_3$;

Y = OH, NHR', SR', $COCH_3$, $CH_2OH$,

$CH_2NHR'$, $CH_2SH$, COOH, $OCOCH_3$, $COOCH_3$, C ≡ N, $N(R')_2$, $—SO_2R'$, —SOR', $—CH_2—S—CH_2—CH=CH_2$, $—CH_2—NH—CH_2CH=CH_2$, $—CH_2—SO_2—CH_2—CH=CH_2$,



wherein R' is as defined above,

t is a mean degree of polymerization, equal to 4–5000, and, after bonding, component A is in mixture with compound $M'R_pZ_{k-p}$ and component B is in mixture with compound $MX_n$.

---

## 4,147,665
## MAGNESIA ADSORBENT

**Yoshikatsu Ikari, Narashino; Shoichiro Yokoyama, Musashi-Murayama; Ryutaro Itaya, and Tsuneo Ohkuma, both of Noboribetsu, all of Japan, assignors to Agency of Industrial Science & Technology, Tokyo and Hokkaido Soda Co., Ltd., Hokkaido, both of, Japan**

**Filed May 31, 1977, Ser. No. 802,117**

**Claims priority, application Japan, Jun. 7, 1976, 51-66214; Sep. 1, 1976, 51-104578**

**Int. Cl.[2] B01J** *21/04, 21/12, 23/02, 23/78*

**U.S. Cl. 252—463** **4 Claims**

1. An adsorbent for treating waste water which comprises a mixture of (1) magnesia obtained by thermal decomposition at 500°–700° C. of a heat decomposable magnesia-producing compound, and (2) 5–40 wt. percent of a metal oxide selected from the group consisting of alumina, ferric oxide, calcium oxide and kaolin.

4,147,666

## ADDITIVES FOR LUBRICANTS

Klaus P. Michaelis, Lindenfels, Odenwald, and Hermann O. Wirth, Bensheim-Auerbach, both of Fed. Rep. of Germany, assignors to Ciba-Geigy AG, Basel, Switzerland

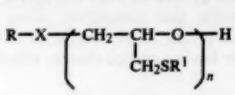
Filed Sep. 27, 1977, Ser. No. 836,939

Claims priority, application Switzerland, Oct. 6, 1976, 12638/76

Int. Cl.[2] C10M *1/38, 3/32, 5/28;* C07C *149/00*

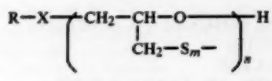
U.S. Cl. 252—48.2 14 Claims

1. A compound of the general formula I



(I)

in which R is linear alkyl having 12 to 24 C atoms, branched alkyl having 8 to 30 C atoms or alkylated phenyl or phenylalkyl having 8 to 24 C atoms, X is an oxygen or sulphur atom, n is an integer from 1 to 8 and $R^1$ is a radical of the formula



in which m is an integer from 0 to 3.

11. A composition comprising a major amount of a mineral oil lubricant, a synthetic oil lubricant or a mixture thereof and from 0.01 to 5% by weight, relevant to the lubricant, of a compound of formula I according to claim 1.

---

4,147,667

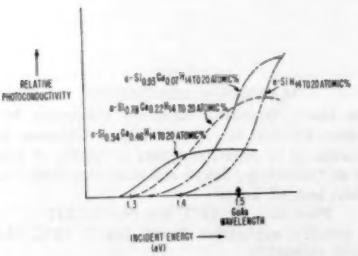
## PHOTOCONDUCTOR FOR GAAS LASER ADDRESSED DEVICES

Jacques P. Chevallier, Maurepas, France; Charles R. Guarnieri, San Jose, Calif.; Aare Onton, and Harold Wieder, both of Saratoga, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 13, 1978, Ser. No. 869,194

Int. Cl.[2] H01C *31/00*

U.S. Cl. 252—501 6 Claims




1. A photoconductor sensitive to illumination from a GaAs laser at about 1.5 eV comprising

amorphous $Si_xA_{1-x}H_y$

where A is selected from the group consisting of Ge, Sn and Pb

x=0.50 to 0.99

y=1 to 50 atomic percent.

4,147,668

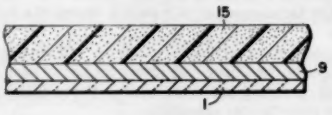
## CONDUCTIVE COMPOSITIONS AND COATING COMPOSITIONS FOR MAKING THE SAME

Charles K. Chiklis, Lexington, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Jun. 30, 1977, Ser. No. 811,471

Int. Cl.[2] H01B *1/04, 1/02, 1/06*

U.S. Cl. 252—503 23 Claims




8. A composition for coating cellophane with a smooth adherent layer of electrode particles in a thermoplastic binder matrix without causing distortion of the cellophane, said composition consisting essentially of a dispersion of electrode particles in a solution of a thermoplastic binder in an organic solvent, said thermoplastic binder consisting essentially of from 70 to 100 parts by weight of a teleblock copolymer of butadiene and styrene and from 0 to 30 parts by weight of polystyrene per 100 parts by weight of binder, and said electrode particles being present in amounts between 85 and 99 parts by weight per 100 parts by weight of particles and binder.

---

4,147,669

## CONDUCTIVE ADHESIVE FOR PROVIDING ELECTRICAL AND THERMAL CONDUCTIVITY

Joseph M. Shaheen, La Habra, and Leo J. Quintana, Orange, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Continuation-in-part of Ser. No. 781,609, Mar. 28, 1977, abandoned. This application Jan. 12, 1978, Ser. No. 869,064

Int. Cl.[2] H01B *1/02*

U.S. Cl. 252—512 7 Claims

1. A conductive adhesive comprising:

a quantity of gallium;

a first powdered conductive material in that quantity which forms a substantially eutectic mixture which is in a completely liquid state at about room temperature when combined with said quantity of gallium wherein said first conductive material is selected from the group consisting of tin, indium, and aluminum;

a second powdered conductive material in that quatity which forms a curable alloy initially having the consistency of a paste and having the composition in percent by weight of from 20–80 percent of said eutectic mixture and from 20–80 percent by weight of said second conductive material when said second conductive material is combined with said eutectic mixture wherein said second conductive material is selected from the group consisting of gold, silver, and copper; and

a low temperature hardening resin material in that quantity which forms said conductive adhesive when combined with said curable alloy, said conductive adhesive having the composition in percent by weight of from about 75–99 percent of said alloy and from about 1–25 percent of said resin material wherein said resin material is selected from the group consisting of epoxy, silicone rubber, and polyester; and wherein said conductive adhesive hardens to a relatively homogenous mass at relatively low termperatures.

4,147,670

## NONOHMIC ZnO CERAMICS INCLUDING $Bi_2O_3$, $C_oO$, MnO, $Sb_2O_3$, AND BOROSILICATE Pb AND/OR Zn GLASS COMPONENTS

Nobuaki Shohata; Tomeji Ohno; Shigeru Ikeda; Takaki Fukushima; Ryuji Igarashi, and Jyun-Ichiro Yoshida, all of Tokyo, Japan, assignors to Nippon Electric Co., Ltd., Tokyo, Japan

Filed Dec. 1, 1976, Ser. No. 746,425

Claims priority, application Japan, Dec. 4, 1975, 50-145332; Feb. 6, 1976, 51-12640; Feb. 6, 1976, 51-12642; Jun. 15, 1976, 51-70133; Jun. 15, 1976, 51-70134

Int. Cl.[2] H01B *1/08*

U.S. Cl. 252—519 16 Claims

1. A nonohmic ceramic material having a voltage nonlinear exponent of at least 30, a dielectric constant of at most about 1000 at 1 KHz, a loss factor of less than 10% at 1 KHz, a breakdown voltage of at most about 500 volts, a load characteristic of at most about 20%, and a current pulse characteristic of at most about 5%, said load characteristic being evaluated by a change in the breakdown voltage for a current of 10 $\mu$A at room temperature before and after a power of 1.5 W/cm$^2$ is imposed for three hours on a 1-mm thick piece of said ceramic material kept at about 80° C., said current pulse characteristic being evaluated by a variation in the breakdown voltage before and after current pulses of 200 amperes are caused to flow through a 1-mm thick piece of said ceramic material, said current pulses having a wave-form of 10×200 microseconds, said ceramic material consisting essentially of a main component of zinc oxide, auxiliary components of bismuth (III) oxide of 0.1–10%, cobalt (II) oxide of 0.05–10%, manganese (II) oxide of 0.25–4%, and antimony (III) oxide of 0.05–6%, the percentages being by mol, and borosilicate lead-zinc glass of 0.1–10% by weight.

7. A nonohmic ceramic material having a voltage nonlinear exponent of at least 30, a dielectric constant of at most about 1000 at 1 KHz, a loss factor of less than 10% at 1 KHz, a breakdown voltage of at most about 500 volts, a load characteristic of at most about 20%, and a current pulse characteristic of at most about 5%, said load characteristic being evaluated by a change in the breakdown voltage for a current of 10 $\mu$A at room temperature before and after a power of 1.5 W/cm$^2$ is imposed for three hours on a 1-mm thick piece of said ceramic material kept at about 80° C., said current pulse characteristic being evaluated by a variation in the breakdown voltage before and after current pulses of 200 amperes are caused to flow through a 1-mm thick piece of said ceramic material, said current pulses having a wave-form of 10×200 microseconds, said ceramic material consisting essentially of a main component of zinc oxide, auxiliary components of bismuth (III) oxide of 0.1–6%, cobalt (II) oxide of 0.05–10%, manganese (II) oxide of 0.25–4%, and antimony (III) oxide of 0.05–6%, the percentages of said auxiliary components being by mol, and borosilicate lead glass in said ceramic material of 0.1–3% by weight.

---

4,147,671

## PERFUME COMPOSITIONS CONTAINING 8 ALLYL-8-HYDROXYTRICYCLO [5,2,1,0$^{2,6}$] DECANE ALONE OR COMBINED WITH o-HYDROXYBENZYL ETHYL ETHER

Harmannus Boelens, Huizen, and Hendrik J. Wobben, Naarden, both of Netherlands, assignors to Naarden International, N.V., Naarden-Bussum, Netherlands

Division of Ser. No. 826,768, Aug. 22, 1977, Pat. No. 4,124,771, which is a division of Ser. No. 635,213, Nov. 25, 1975, Pat. No. 4,057,516. This application Apr. 4, 1978, Ser. No. 893,449

Int. Cl.[2] C11B *9/00*

U.S. Cl. 252—522 4 Claims

1. A perfume composition comprising components usual for this purpose and at least one compound reminiscent of castoreum selected from the group consisting of 8-allyl-8-hydroxytricyclo 5,2,1,0$^{2,6}$ decane or a mixture of 8-allyl-8-hydroxytricyclo-5,2,1,0$^{2,6}$ decane and o-hydroxybenzyl ethyl ether.

4,147,672

## CYCLIC $C_6$ KETONES IN PERFUMES

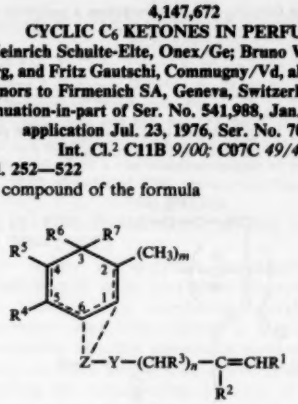
Karl-Heinrich Schulte-Elte, Onex/Ge; Bruno Willhalm, Chene-Bourg, and Fritz Gautschi, Commugny/Vd, all of Switzerland, assignors to Firmenich SA, Geneva, Switzerland

Continuation-in-part of Ser. No. 541,988, Jan. 17, 1975. This application Jul. 23, 1976, Ser. No. 708,075

Int. Cl.[2] C11B *9/00*; C07C *49/43*

U.S. Cl. 252—522 35 Claims

1. A compound of the formula



(I)

having a saturated ring or an isolated double bond in position 1, 4 or 6 or two double bonds in position 1 and 4, 1 and 5, or 4 and 6 of the ring as indicated by the dotted lines, and wherein:

m stands for integers 0 or 1;

n stands for integers 0, 1 or 2;

Z is bound to the ring carbon atoms in position 1 or 6 and represents the group -CO;

Y represents a methylene group;

each of the symbols $R^1$, $R^2$, $R^3$, $R^4$ and $R^5$ designates a hydrogen atom or one of them represents a methyl radical and each of the others a hydrogen atom, and each of the symbols $R^6$ and $R^7$ represents an alkyl radical having from 1 to 3 carbon atoms or one of them represents an alkyl radical as defined above and the other a hydrogen atom.

---

4,147,673

## DETERGENT COMPOSITION CONTAINING SULFINYL DIPROPIONIC ACIDS

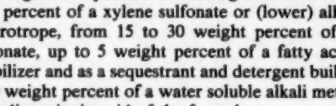
Lothar G. Dulog, St. Martens-Latem, Belgium, and Alfred G. Maasböl, Hamburg, Fed. Rep. of Germany, assignors to s.a. Texaco Belgium n.v., Brussels, Belgium

Filed Apr. 11, 1975, Ser. No. 567,331

Int. Cl.[2] C11D *1/14, 3/34*

U.S. Cl. 252—548 4 Claims

1. A detergent composition containing from about 3 to about 9 weight percent of a xylene sulfonate or (lower) alkyl sulfonate hydrotrope, from 15 to 30 weight percent of a linear alkylsulfonate, up to 5 weight percent of a fatty acid amide foam stabilizer and as a sequestrant and detergent builder from 0.1 to 1.0 weight percent of a water soluble alkali metal salt of a sulfinyl dipropionic acid of the formula:



wherein $R_1$, $R_2$, $R_3$ and $R_4$ are the same or different and are hydrogen or lower alkyl, the balance water.

---

4,147,674

## AQUEOUS COATING COMPOSITION OF AN ACRYLIC-VINYL OXAZOLINE ESTER POLYMER

Joseph A. Vasta, Woodbury, N.J., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Dec. 1, 1977, Ser. No. 856,505

Int. Cl.[2] C08L *1/10, 1/14*

U.S. Cl. 260—17 R 17 Claims

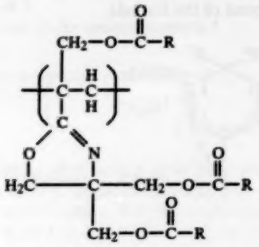
1. An aqueous coating composition comprising about a 5–60% by weight, based on the weight of the coating composition, of a film forming binder and 40–95% by weight, based on the weight of the coating composition, of an aqueous medium;

wherein the film forming binder comprises a polymer consisting essentially of polymerized monomers of about

(a) 22–28% by weight, based on the weight of the polymer, of styrene;

(b) 22–28% by weight, based on the weight of the polymer, of methyl methacrylate;

(c) 37–43% by weight, based on the weight of the polymer, of vinyl oxazoline ester of the formula



where R is the residue of a drying oil fatty acid selected from the group consisting of soya oil fatty acids, linseed oil fatty acids, tall oil fatty acids or mixtures thereof;

(d) 3–7% by weight, based on the weight of the polymer, of lauryl methacrylate; and

(e) 3–7% by weight, based on the weight of an ethylenically unsaturated carboxylic acid selected from the group consisting of acrylic acid and metharylic acid; and containing sufficient ammonia or amine to provide a pH of about 7.5–9.5.

**10**. The coating composition of claim **1** containing about 0.5 to 10% by weight, based on the weight of the binder, of cellulose acetate butyrate.

---

**4,147,675**

## OIL-MODIFIED ALKYD RESIN COMPOSITIONS

**Mitsutoshi Aritomi, Ibaraki, Japan, assignor to Mitsubishi Petrochemical Company Limited, Japan**

**Filed Nov. 23, 1977, Ser. No. 854,232**

**Claims priority, application Japan, Nov. 29, 1976, 51-143182**

**Int. Cl.[2] C09D** *3/64, 3/68*

**U.S. Cl. 260—22 CB** **9 Claims**

**1**. An oil-modified alkyd resin composition comprising: from 30 to 70 percent by weight of an ingredient (A) comprising an oil-modified alkyd resin of an oil length of from 30 to 70 percent which is a poly condensation reaction product of:

(a) a polybasic acid,

(b) a polyhydric alcohol,

(c) a saturated or unsaturated fatty acid or oil, and

(d) an $\alpha,\beta$-unsaturated monocarboxylic acid selected from the group consisting of sorbic acid, crotonic acid, and 2-(beta-furyl)acrylic acid, the content of the $\alpha,\beta$-unsaturated monocarboxylic acid in the alkyd resin being 0.5 to 30 percent by weight; and from 70 to 30 percent by weight of an ingredient (B) comprising a polymerizable monomer having a boiling point higher than 200° C. in which the ingredient (A) is dissolved.

---

**4,147,676**

## CATHODICALLY DEPOSITABLE COATING COMPOSITIONS AND METHOD OF PREPARING

**Georgios Pampouchidis, Graz, Austria, assignor to Vianova Kunstharz, A.G., Vienna, Austria**

**Filed Nov. 7, 1977, Ser. No. 849,265**

**Claims priority, application Austria, Nov. 8, 1976, 8278/76**

**Int. Cl.[2] C09D** *3/72, 5/02, 5/40*

**U.S. Cl. 260—23 TN** **19 Claims**

**1**. Self-crosslinking cathodically depositable binders comprising the reaction product of

(A) the reaction product of

(a) 2 moles of a diepoxy compound having an epoxy equivalent of at least 100;

(b) 1 mole of a member of the group consisting of aliphatic diamines, cycloaliphatic diamines, aromatic diamines, and mixtures thereof, the nitrogen atoms of said diamines being secondary-secondary or primary-tertiary nitrogen atoms; and

(c) 2 moles of a member of the group consisting of saturated monocarboxylic acids, unsaturated monocarboxylic acids, and mixtures thereof;

and

(B) an alpha,beta-ethylenically unsaturated monoisocyanate; the alpha,beta-double bond functionality of said binder being at least 0.5 and said binder being water soluble upon neutralization with an acid.

---

**4,147,677**

## DRY BLENDING OF NEUTRALIZED SULFONATED ELASTOMERIC POWDERS

**Robert D. Lundberg, Bridgewater; Henry S. Makowski, Scotch Plains, both of N.J., and Jan Bock, Houston, Tex., assignors to Exxon Research & Engineering Co., Florham Park, N.J.**

**Filed Nov. 29, 1977, Ser. No. 855,764**

**Int. Cl.[2] C08L** *91/00*

**U.S. Cl. 260—23.5 A** **33 Claims**

**1**. An elastomeric composition comprising a free flowing, finely divided powder of a neutralized, sulfonated EPDM terpolymer, said EPDM terpolymer having a number average molecular weight of about 10,000 to about 200,000; an ethylene content of about 40 to less than 70 wt. %; a sulfonate content of about 10 to about 50 meq. neutralized sulfonate groups per 100 grams of said terpolymer, said neutralized sulfonate groups having a metal counterion selected from the group consisting of antimony, iron, lead and Groups I-A, II-A, I-B, and II-B of the Periodic Table of Elements and mixtures thereof, wherein said free flowing, finely divided powder of said neutralized sulfonated EPDM terpolymer has an average particle diameter ranging from about 0.1 mm to about 4 mm, said powder not agglomerating at ambient temperatures under pressure into a fused mass.

---

**4,147,678**

## FLAME-RETARDANT POLYURETHANE COMPOSITIONS

**Chung-Ling Mao, Sandy Hook, and Walter Nudenberg, Newtown, both of Conn., assignors to Uniroyal, Inc., New York, N.Y.**

**Filed May 13, 1977, Ser. No. 796,585**

**Int. Cl.[2] C08K** *3/38*

**U.S. Cl. 260—28.5 R** **15 Claims**

**1**. A flame-retarded composition comprising a chain extendable crosslinkable polyurethane prepolymer and

(a) about 10 to about 50 parts by weight per 100 parts by weight of polyurethane of an organic additive selected from the group consisting of chlorine-substituted and bromine-substituted aliphatic, aromatic, alicyclic and mixed hydrocarbyl compounds having a halogen content in the range of about 35 to about 80 weight percent and optionally containing oxygen substituents in the form of hydroxyl, anhydride, ether, ester or amide groups and which are substantially non-volatile, stable and non-reactive toward said polyurethane and any auxiliary ingredients of said composition at the curing temperature of said polyurethane, and mixtures thereof;

(b) about 1 to about 10 parts by weight per 100 parts by weight of polyurethane of a metallic compound selected from the group consisting of the antimony oxides, sulfides of antimony, antimony salts of the alkali metals of Group I of the Periodic Table, antimony salts of organic acids and their pentavalent derivatives, esters of antimonius acids and their pentavalent derivatives, cyclic antimonites, the oxides of arsenic and the oxides of bismuth; and

(c) about 3 to about 40 parts by weight per 100 parts by weight of polyurethane to a $C_1$ to $C_5$ hexaalkoxymethyl melamine.

---

4,147,679

## WATER-REDUCED URETHANE COATING COMPOSITIONS

Roger L. Scriven, and Wen-Hsuan Chang, both of Gibsonia, Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 582,946, Jun. 2, 1976, Pat. No. 4,066,591. This application Nov. 21, 1977, Ser. No. 853,780
The portion of the term of this patent subsequent to Jan. 3, 1995, has been disclaimed.
Int. Cl.[2] C08L 75/12
U.S. Cl. 260—29.2 TN 32 Claims

1. A non-sedimenting aqueous dispersion which is emulsifiable in the absence of added emulsifier of an ungelled polyurethane having a finely particulated dispersed phase of less than 10 microns which requires only mild agitation for dispersion formed by reacting in aqueous medium in which water is the principal ingredient:

(A) NCO-containing polymer containing anionic salt groups having monovalent counter ions and having a salt group equivalent weight of 200 to 5000 being substantially free of highly active hydrogens, and having a viscosity of 50 to 10,000 centipoises, said polymer formed from:

(1) an organic polyisocyanate and

(2) an active hydrogen-containing material containing at least 2 active hydrogens per molecule,

said organic polyisocyanate and said active hydrogen-containing compound containing a total of not more than 1 gram-mole of compounds having a functionality of 3 or more per 500 grams of organic polyisocyanate and active hydrogen-containing material; the equivalent ratio of NCO in (1) to active hydrogen in (2) being at least about 4/3; the anionic salt groups introduced into said NCO-containing polymer through the active hydrogen-containing material (2);

(B) active hydrogen-containing material in which the active hydrogens are more reactive with NCO groups than water to form a polyurethane having an intrinsic viscosity less than 4.0 deciliters per gram; said aqueous dispersion containing at least 15 percent by weight aqueous medium based on total weight of ungelled polyurethane and aqueous medium of which at least 30 percent by weight of the aqueous medium is water with co-solvent constituting the remainder of the aqueous medium.

---

4,147,680

## PRODUCTION OF POLYURETHANE RESINS USING AS ACTIVE HYDROGEN MATERIAL A STABLE DISPERSION OF IONIC POLYISOCYANATE-POLYADDITION PRODUCTS IN HYDROXYL CONTAINING COMPOUNDS AS A DISPERSING AGENT

Artur Reischl, Leverkusen; Gert Jabs, Cologne, and Alberto C. Gonzalez-Dörner, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Nov. 10, 1976, Ser. No. 740,450
Claims priority, application Fed. Rep. of Germany, Nov. 12, 1975, 2550797
Int. Cl.[2] C08G 18/38
U.S. Cl. 260—29.2 TN 6 Claims

1. In a process for the production of polyurethane resins in which polyisocyanates are reacted with materials containing active hydrogen atoms, the improvement wherein the active hydrogen containing material is a stable dispersion of an ionic polyisocyanate-polyaddition product in a hydroxyl containing compound as dispersing agent.

4,147,681

## STABLE, SELF-INVERTING WATER-IN-OIL EMULSIONS

Sim Koei Lim, Venetia; Arnold E. Bloomquist, Bethel Park, and Raymond J. Schaper, Pittsburgh, all of Pa., assignors to Calgon Corporation, Pittsburgh, Pa.

Division of Ser. No. 660,886, Feb. 24, 1976, Pat. No. 4,077,930, which is a continuation of Ser. No. 487,931, Jul. 16, 1974, abandoned, which is a continuation-in-part of Ser. No. 402,570, Oct. 1, 1973, abandoned. This application Nov. 21, 1977, Ser. No. 853,740
Int. Cl.[2] C08L 33/02; D21H 3/38; C08L 33/14, 33/24
U.S. Cl. 260—29.6 TA 1 Claim

1. A stable, self-inverting water-in-oil acrylamide, acrylamide/acrylic acid, acrylamide/2-acrylamido-2-methyl propane sulfonic acid, acrylamide/3-acrylamido-3-methyl butyl trimethyl ammonium chloride or acrylamide/2-methacryloyloxyethyl trimethyl ammonium methosulfate polymer-containing emulsion prepared by a process which comprises polymerizing the corresponding monomer or monomers at a temperature at from about 0° to about 100° C. with agitation in the presence of water, an inert hydrophobic liquid and a free radical catalyst, and also in the presence of at least 20 percent by weight, based on the weight of the oil phase, of an emulsifier having an HLB of at least 7, and continuing the polymerization until the reaction is substantially complete.

---

4,147,682

## ADDITIVE COMPOSITION FOR USE IN PAPERMAKING

Akira Yada, Nagoya; Isamu Iijima, Mishima; Jo Itakura, and Saburo Fujikura, both of Nagoya, all of Japan, assignors to Toagosei Chemical Industry Co., Ltd., Tokyo and Osakagodo Company Ltd., Osaka, both of, Japan

Filed Dec. 7, 1977, Ser. No. 858,500
Claims priority, application Japan, Dec. 9, 1976, 51-147175
Int. Cl.[2] C08L 33/04
U.S. Cl. 260—29.6 SQ 15 Claims

1. An additive composition for use in paper-making, which comprises

(1) a water-soluble polymer containing as a structural unit a vinyl monomer having —COOH group or a vinyl monomer having —$SO_3H$ group or both of them in a proportion of 0.05 to 10 mole percent (in terms of monocarboxylic sulfonic acid) based on the water soluble polymer,

(2) polyaluminum chloride of the formula

$$[Al_2(OH)_nCl_{6-n}]_m$$

where $1 \leqq n \leqq 5$ and $m \leqq 10$,

the amount of polyaluminum chloride in terms of aluminum atom being at least equivalent to the —COOH group and/or —$SO_3H$ group in the water-soluble polymer, and an aqueous solvent.

4. A composition according to claim 1, wherein the water-soluble polymer contains as a structural unit 0.05 to 5 mole percent of a vinyl monomer having —$SO_3H$ group as a monosulfonic acid.

4,147,683

## FLUOROCARBON POLYMER-POLYMERIC ADJUNCT COATING COMPOSITIONS STABILIZED AGAINST DISCOLORATION

Eustathios Vassiliou, Newark, Del., and William Van Hoeven, Jr., Wallingford, Pa., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 775,277, Mar. 7, 1977, abandoned, which is a continuation-in-part of Ser. No. 570,951, Apr. 22, 1975, abandoned, which is a continuation-in-part of Ser. No. 457,638, Apr. 3, 1974, abandoned. This application Aug. 2, 1977, Ser. No. 820,684

Int. Cl.[2] C08L *57/08;* C08K *3/22*

U.S. Cl. 260—29.6 F 12 Claims

1. A composition suitable for making a light-colored fused fluorocarbon polymer coating, said composition consisting essentially of

(a) about 25%–95%, by weight of the total of (a) and (b), of a fluorocarbon polymer polymerized or copolymerized from monomers selected from monoethylenically unsaturated hydrocarbon monomers and hydrocarbon ether monomers, said monomers being completely substituted with fluorine atoms or a combination of fluorine atoms and chlorine atoms, the polymer having a number average molecular weight of at least 20,000;

(b) about 2%–75%, by weight of the total of (a), (b) and (c), of a polymer of ethylenically unsaturated monomers which depolymerizes, and whose depolymerization products vaporize in the temperature range of about 150° C. below the fusion temperature of the fluorocarbon polymer used to about the fluorocarbon polymer's decomposition temperature;

the amounts of (a) and (b) totaling 100%;

(c) enough of at least one compound of at least one of the metals

| | |
|---|---|
| cobalt | cerium |
| iron | and |
| [bismuth] | manganese |

which compound decomposes in the temperature range of about 100° C.–500° C. to give at least 0.2%, by weight of the metal in the compound, of an oxide or hydroxide,

to provide at least about 0.005 parts of metal per hundred of (a); and

(d) a liquid carrier.

---

4,147,684

## PLASTICIZED COMPOSITIONS CONTAINING POLYMERS CHARACTERIZED BY 1,3-IMIDAZOLIDINE-1,3-DIYL RINGS AND N,N-DIALKYL AROMATIC SULFONAMIDES

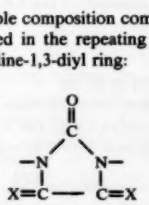
Tad L. Patton, Baytown, Tex., assignor to Exxon Research & Engineering Co., Florham Park, N.J.

Filed Feb. 1, 1978, Ser. No. 873,913

Int. Cl.[2] C08K *5/36*

U.S. Cl. 260—30.8 R 20 Claims

1. A stable extrudable composition comprising heterocyclic polymers characterized in the repeating unit by the tri-substituted 1,3-imidazolidine-1,3-diyl ring:



wherein X = O or NH, provided at least one X is O and a plasticizing amount of N,N-dialkyl aromatic sulfonamide.

4,147,685

## PRIMER COMPOSITIONS FOR ADHERING SILICONE COMPOSITIONS

Alfred H. Smith, Jr., Ballston Lake, N.Y., assignor to General Electric Company, Waterford, N.Y.

Filed Jan. 28, 1977, Ser. No. 763,381

Int. Cl.[2] C08F *30/08, 130/08;* C08G *77/06*

U.S. Cl. 260—31.2 R 8 Claims

1. A primer composition for adhering silicone compositions to metal and plastic substrates comprising (1) the reaction product of a reaction mixture of an alkyl methacrylate or alkyl acrylate where the alkyl is selected from methyl, butyl and mixtures thereof, an acrylate silane of the formula,

$$X\,Si\,Y_3$$

wherein X is selected from the class consisting of

$$CH_2{=}CHCOO(CH_2)_3{-}$$

and

$$CH_2{=}C(CH_3)COO(CH_2)_3{-}$$

and Y is a hydrolyzable radical and a vinyl containing siloxane of the formula,

$$R_aR'_bSiO_{(4-a-b/2)}$$

in an organic solvent wherein there is present prior to reaction from 1 to 12 moles of said methacrylate or acrylate per mole of said acrylate silane and from 0.1 to 1 mole of said vinyl containing siloxane per mole of said methacrylate or acrylate, where R′ is vinyl and R is selected from the class consisting of alkyl radicals, aryl radicals, cycloalkyl radicals and fluoroalkyl radicals of 1 to 8 carbon atoms, a varies from 1 to 3, b is 1 or 2 and the sum of a + b cannot exceed 4 and (2) at least 10% by weight of the total composition of a silane of the formula,

$$X\,Si\,Y_3$$

wherein X and Y are as previously defined wherein the reaction product is obtained by heating the reaction mixture at a temperature of 50°–120° C. in the presence of a peroxide catalyst.

---

4,147,686

## SMOKE-SUPPRESSANT POLYMER COMPOSITIONS

John S. Heckles, and Norman L. Miller, both of Lancaster, Pa., assignors to Armstrong Cork Company, Lancaster, Pa.

Division of Ser. No. 765,638, Feb. 4, 1977, Pat. No. 4,085,081. This application Nov. 22, 1977, Ser. No. 853,899

Int. Cl.[2] C08K *5/10, 5/04*

U.S. Cl. 260—31.8 R 3 Claims

1. A plasticized vinyl chloride polymer composition comprising a polymeric vinyl chloride resin containing at least 50% polymerized vinyl chloride and 0–50% of a copolymerized olefinically unsaturated monomer and 20 to 40 parts per 100 parts of said resin of a plasticizer having the formula

$$ROC(O)C(O)OR'$$

wherein R and R′ each separately represent $C_1$ to $C_8$ alkyl, $C_6$ to $C_{12}$ cycloalkyl or $C_1$ to $C_8$ alkoxy-substituted $C_1$ to $C_8$ alkyl.

4,147,687

## FORMED OBJECTS OF COAL FLYASH AND METHODS OF MAKING THE SAME

Hugh T. O'Donnell, 929 Corporation St., Beaver, Pa. 15009

Continuation of Ser. No. 576,388, May 12, 1975, abandoned, which is a continuation-in-part of Ser. No. 360,185, May 14, 1973, abandoned. This application Jun. 23, 1977, Ser. No. 809,475

Int. Cl.[2] C08J 3/20; C08K 3/02, 5/01

U.S. Cl. 260—33.6 R 7 Claims

1. A new rigid, formed decorative and structural product consisting of about 75% to 95% coal flyash and the balance a matrix of plastic resin from the group consisting of thermoplastic and thermosetting resins and an effective amount of 0.1% up to 1% of mineral oil to aid mixing of the coal flyash and the plastic resin.

---

4,147,688

## METHOD OF PREPARING DISPERSIONS OF GELLED POLYMERIC MICROPARTICLES AND PRODUCTS PRODUCED THEREBY

Joseph M. Makhlouf, Mars, and Samuel Porter, Jr., Tarentum, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 559,949, Mar. 19, 1975, abandoned. This application Jun. 13, 1977, Ser. No. 805,679

Int. Cl.[2] C08K 5/01

U.S. Cl. 260—33.6 EP 24 Claims

1. A dispersion containing from 20 to 60 percent by weight crosslinked acrylic polymer microparticles having a particle size of from 0.1 to 10 microns, said dispersion being formed by free radical addition copolymerization of from 0.5 to 15 percent of alpha, beta-ethylenically unsaturated monocarboxylic acid, from 70 to 66 percent of at least one other copolymerizable monoethylenically unsaturated monomer and from 0.5 to 15 percent of crosslinking monomer selected from the group consisting of (1) epoxy group-containing compound and (2) a mixture of alkylenimine and organoalkoxysilane, wherein:

a. said epoxy group-containing compound is monoepoxide compound which additionally contains ethylenic unsaturation,

b. said organoalkoxysilane is selected from the group consisting of acrylatoalkoxysilane, methacrylatoalkoxysilane and vinylalkoxysilane, and

c. said monomer percentages are based on the weight of monomers used in the copolymerization process,

in the presence of hydrocarbon dispersing liquid which is a solvent for the polymerizable monomers but a non-solvent for the resultant polymer, and polymeric dispersion stabilizer containing at least two segments of which one segment is solvated by said dispersing liquid and a second segment is of different polarity than said first segment and is relatively insoluble in said dispersing liquid, wherein the reaction is carried out at elevated temperature such that the dispersion polymer first forms and then is crosslinked.

---

4,147,689

## TRIFUNCTIONAL ANTIOXIDANT FOR POLYOLEFINS

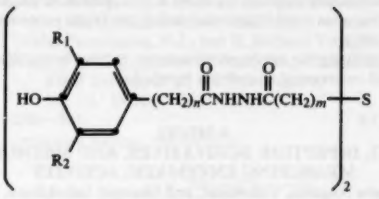
John W. Thompson, and Richard H. S. Wang, both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation of Ser. No. 709,679, Jul. 29, 1976, abandoned. This application Nov. 16, 1977, Ser. No. 851,925

Int. Cl.[2] C08K 5/36; C07C 109/10

U.S. Cl. 260—45.9 NC 6 Claims

1. A stabilizer comprising a thiodicarboxyl, two hydrazo, and two ortho-alkylphenolic moieties as follows:




wherein $R_1$ is a straight or branched alkyl group of 1–8 carbons; $R_2$ is selected from hydrogen, alkyl of 1–6 carbons, and aryl of 6–10 carbons; n is 0, 1 or 2; and m is 1 or 2.

4. Polyolefin material containing a stabilizing amount of the stabilizer of claim 1.

---

4,147,690

## SMOKE AND FIRE RESISTANT COMPOSITIONS

Russell P. Rich, Baltimore, Md., assignor to The Burns & Russell Company of Baltimore, Baltimore, Md.

Continuation of Ser. No. 627,457, Oct. 30, 1975, abandoned. This application Dec. 13, 1977, Ser. No. 860,220

Int. Cl.[2] C08K 3/22

U.S. Cl. 260—45.7 R 57 Claims

1. A composition comprising (I) a mixture comprising (a) magnesium hydroxide and (b) alumina trihydrate and (II) a polymer which is (A) a polyester, (B) an epoxy resin, (C) a vinyl chloride polymer or (D) a polyurethane, the mixture of magnesium hyroxide and alumina trihydrate being present in an amount sufficient to impart improved flame or smoke resistance, wherein (1) when the polymer is a non-halogenated polyester there is employed 25 to 100 parts of (I) per 100 parts of polymer, the ratio of (a) to (b) being from 5:95 to 95:5; (2) when the polymer is a halogenated polyester there is employed 5 to 100 parts of (I) per 100 parts of polymer, the ratio of (a) to (b) being from 5:95 to 2:1; (3) when the polymer is an epoxy resin there is employed 5 to 100 parts of (I) per 100 parts of polymer, the ratio of (a) to (b) being from 9:95 to 2:1 at 5 to 90 parts per 100 parts of polymer and 5:95 to 1:1 at above 90 up to 100 parts per 100 parts of polymer (4) when the polymer is a vinyl chloride polymer there is employed 4 to 50 parts of (I) per 100 parts of polymer, the ratio of (a) to (b) being 5:95 to 95:5; and (5 ) when the polymer is a polyurethane there is employed 50 parts of (I) per 100 parts of polymer, the ratio of (a) to (b) being 1:1.

---

4,147,691

## PROCESS FOR THE EXTRACTION AND PURIFICATION OF CESALIN

Rex Montgomery, and Chao-Kuo Chiang, both of Iowa City, Iowa, assignors to University of Iowa Research Foundation, Iowa City, Iowa

Filed Mar. 31, 1977, Ser. No. 783,511

Int. Cl.[2] C07G 7/00; A61K 35/78

U.S. Cl. 260—112 R 1 Claim

1. A process for obtaining a proteinaceous extract of about 110,000 molecular weight having antitumor activity from the *Caesalpinia gillesii* plant comprising the steps of:

(1) subjecting the whole seed of *Caesalpinia gillesii* to mechanical disruption to separate the endosperm and the seed coat portions and removing the seed coat portion;

(2) extracting the endosperm portion with a halogenated aliphatic hydrocarbon solvent to remove therefrom an oily lipid, leaving defatted crude endosperm;

(3) extracting the crude defatted endosperm with water to recover those protein components extractable with water;

(4) dialyzing the water extract against water, and separating the non-dialyzable portion into a precipitate and a supernatant portion;

(5) treating said supernatent portion with an acid to acidify

said portion to a pH of about 4.5–5.0 or saturating it with ammonium sulphate to form a precipitate of crude proteinaceous extract and recovering the crude proteinaceous extract;

(6) purifying the crude proteinaceous extract by gel filtration and recovering therefrom by elution.

---

**4,147,692**

## NOVEL DIPEPTIDE DERIVATIVES, AND METHOD OF MEASURING ENZYMATIC ACTIVITY

**Toshiharu Nagatsu, Yokohama, and Shumpei Sakakibara, Suita, both of Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan**

**Filed Feb. 17, 1978, Ser. No. 878,826**

**Claims priority, application Japan, Feb. 26, 1977, 52-20663; Jun. 16, 1977, 52-71469**

**Int. Cl.[2] C07C *103/52***

**U.S. Cl. 260—112.5 R** **5 Claims**

1. 7-Glycyl-prolylamino-4-methylcoumarin, and acid salts and N-endo-protected derivatives thereof.

---

**4,147,693**

## LACTAM ANTIBIOTICS AND PROCESS FOR THEIR USE

**Hans-Bodo Konig; Karl G. Metzger; Michael Preiss, and Wilfried Schrock, all of Wuppertal, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

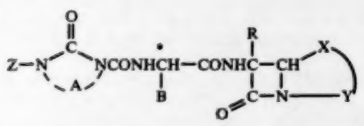
**Filed Nov. 13, 1975, Ser. No. 631,515**

**Claims priority, application Fed. Rep. of Germany, Nov. 28, 1974, 2456307; Mar. 25, 1975, 2512998; Jun. 7, 1975, 2525541**

**Int. Cl.[2] A61K *31/54, 31/545;* C07D *501/34, 499/46***

**U.S. Cl. 424—246** **46 Claims**

1. A compound selected from the group consisting of a β-lactam of the formula



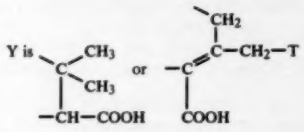
and the pharmaceutically acceptable salts thereof wherein the carbon atom designated C constitutes a center of chirality and

R is hydrogen or methoxy

A is ethylene, trimethylene or benzo;

B is phenyl, hydroxyphenyl, halophenyl, lower alkylphenyl, cyanophenyl, methylsulfonylphenyl, cyclohexenyl or cyclohexadienyl;

X is S, O, SO, $SO_2$ or $CH_2$;



in which T is hydrogen, hydroxy, lower alkanoyloxy, pyridinium, carbamoyloxy, azido, cyano, phenylthio or Het-S- in which Het is a 5- to 6-membered heterocyclic ring containing 1 to 4 hetero-atoms selected from the group consisting of oxygen, sulfur and nitrogen, and containing up to two substituents selected from the group consisting of halo, amino, lower alkylamino, di-lower alkylamino, lower alkyl, cycloalkyl, lower alkoxy, trifluoromethyl, phenyl, benzyl and lower alkanoylamido; and

Z is $R^1$—CH=N—

in which $R^1$ is cycloalkyl of 3 to 10 carbon atoms; cycloalkenyl of 3 to 10 carbon atoms; a pyridyl, styryl or phenyl group unsubstituted or substituted by one or two substituents selected from the group consisting of fluoro, chloro, bromo, lower alkyl, lower alkoxy, nitro, cyano, lower alkylsulfonyl or carbo(lower alkoxy); a thienyl or furyl group unsubstituted or substituted by one or two substituents selected from the group consisting of fluoro, chloro, bromo, lower alkyl, carbo(lower alkoxy), lower alkanoyloxy and lower alkanoyloxymethyl; or isoxazolyl unsubstituted or substituted by methyl.

25. The method of combatting bacterial infections in animals and humans which comprises administering thereto an antibacterially effective amount of a compound according to claim 1.

---

**4,147,694**

## 8-(1H-TETRAZOL-5-YL-CARBAMOYL)QUINOLINE COMPOUNDS

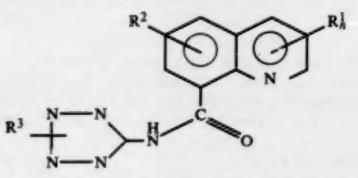
**Edward H. Erickson, Woodbury, Minn., assignor to Riker Laboratories, Inc., Northridge, Calif.**

**Continuation-in-part of Ser. No. 766,511, Feb. 7, 1977, abandoned. This application Dec. 14, 1977, Ser. No. 860,625**

**Int. Cl.[2] C07D *215/24***

**U.S. Cl. 546—169** **4 Claims**

1. A compound of the formula



wherein $R^1$ is alkyl or alkoxy of one or two carbon atoms, $R^2$ is alkyl or alkoxy of one or two carbon atoms, hydrogen, nitro or halogen, $R^3$ is hydrogen or alkyl of one to four carbon atoms and n is zero, one or two, and pharmaceutically acceptable salts thereof.

---

**4,147,695**

## 11β-SUBSTITUTED-Δ[9]-STEROIDS

**Jean G. Teutsch, Le Blanc-Mesnil, France, assignor to Roussel Uclaf, Paris, France**

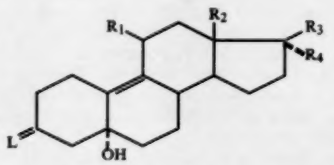
**Filed Jan. 6, 1978, Ser. No. 867,484**

**Claims priority, application France, Jan. 13, 1977, 77 00857**

**Int. Cl.[2] C07J *21/00***

**U.S. Cl. 260—239.55 C** **13 Claims**

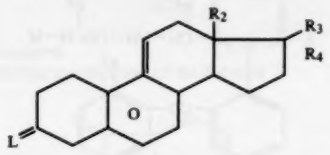
1. A compound having the formula



wherein L is a ketal, $R_1$ is selected from the group consisting of branched and straight chain alkyl of 1 to 12 carbon atoms, unsaturated alkyl of 2 to 8 carbon atoms optionally substituted with a member selected from the group alkoxy and alkylthio of 1 to 4 carbon atoms and halogens, aryl of 6 to 12 carbon atoms and aralkyl of 7 to 13 carbon atoms optionally substituted with a member selected from the group consisting of alkoxy and alkylthio of 1 to 4 carbon atoms and halogens, thienyl, isothienyl and furyl, $R_2$ is alkyl of 1 to 4 carbon atoms and $R_3$ is selected from the group consisting of hydrogen, hydroxy, acyloxy of an organic carboxylic acid of 1 to 18 carbon atoms, alkoxy of 1 to 8 carbon atoms and acyl of an organic carboxylic acid of 1 to 18 carbon atoms and $R_4$ is selected from the group consisting of hydrogen, hydroxy, alkyl and alkxoy of 1 to 8 carbon atoms, alkenyl and alkynyl of 2 to 8 carbon atoms, acyloxy of an organic carboxylic acid of 1 to 18 carbon atoms

and cyano, or one of $R_3$ and $R_4$ is a blocked hydroxy in the form of an easily removable ether and the other is cyano, or $R_3$ and $R_4$ form a ketone optionally protected as a cyclic ketal.

12. A process for the preparation of a compound of claim 1 comprising reacting a compound of the formula



wherein L is a ketal and $R_3$ is selected from the group consisting of hydrogen, hydroxy, acyloxy of an organic carboxylic acid of 1 to 18 carbon atoms, alkoxy of 1 to 8 carbon atoms and acyl of an organic carboxylic acid of 1 to 18 carbon atoms and $R_4$ is selected from the group consisting of hydrogen, hydroxy, alkyl and alkoxy of 1 to 8 carbon atoms, alkenyl and alkynyl of 2 to 8 carbon atoms, acyloxy of an organic carboxylic acid of 1 to 18 carbon atoms and cyano, or one of $R_3$ and $R_4$ is a blocked hydroxy in the form of an easily removable ether and the other is cyano, or $R_3$ and $R_4$ form a ketone optionally protected as a cyclic ketal with a compound of a formula selected from the group consisting of $(R_1)_2$ CuLi, $R_1$ MgHal and $R_1$ Li wherein $R_1$ has the above definition and Hal is a halogen in the presence of a catalytic amount of a cuprous halide when $R_1$ Mg Hal and $R_1$ Li are used.

---

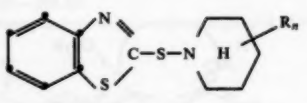
**4,147,696**

## 1-(2-BENZOTHIAZOLYLTHIO)-PIPERIDINES

**Seiji Sagawa, Hirakata; Kenichiro Numata, and Hisanori Kondo, both of Nishinomiya, all of Japan, assignors to Sumitomo Chemical Company, Limited, Japan**

**Continuation-in-part of Ser. No. 110,868, Jan. 29, 1971, abandoned. This application Apr. 17, 1973, Ser. No. 352,000**
**Claims priority, application Japan, Jan. 30, 1970, 45-8620**
**Int. Cl.² C07D *417/12***
**U.S. Cl. 546—198** **8 Claims**

1. A 1-(2-benzothiazolylthio)-piperidine compound of the formula:



wherein R is a $C_1$-$C_4$ alkyl group substituted at least at the 3, 4 and/or 5 positions and n is an integer of from 1 to 3.

---

**4,147,697**

## QUATERNARIZATION OF DIPYRIDYL ACETATE TO N,N'-DIMETHYL-4,4'-DIPYRIDYLIUM DIHALIDE IN ACETIC ACID

**Mario Bornengo, Massa, and Sergio Bacciarelli, Ferrara, both of Italy, assignors to Montedison S.p.A., Milan, Italy**

**Filed Jan. 10, 1978, Ser. No. 868,383**
**Claims priority, application Italy, Jan. 12, 1977, 19216 A/77**
**Int. Cl.² C07D *213/22***
**U.S. Cl. 546—258** **6 Claims**

1. A process for quaternarizing 4,4'-dipyridyl diacetate to N,N'-dimethyl-4,4'-dipyridylium dihalide by reaction with an alkyl halide, characterized in that the reaction is conducted by:

using acetic acid as solvent for the dipyridyl diacetate in amounts of at least 1:1 by weight in respect of the diacetate subjected to reaction; and

heating the reactants at temperatures ranging from 60° to 150° C. and at pressures ranging from 2–10 kg/cm².

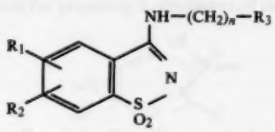
**4,147,698**

## 3-(HETEROCYCLICALKYLAMINO)BENZISOTHIAZOLE-1,1-DIOXIDES

**Peter C. Wade, Pennington, N.J., and B. Richard Vogt, Yardley, Pa., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.**

**Filed Jul. 13, 1978, Ser. No. 924,340**
**Int. Cl.² C07D *275/06*; A61K *31/425***
**U.S. Cl. 260—301** **6 Claims**

1. A compound having the formula

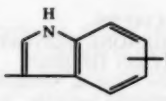


or a pharmaceutically acceptable salt thereof,

wherein:

$R_1$ is hydrogen, halogen, alkyl, alkoxy or nitro and $R_2$ is hydrogen, halogen or alkoxy, provided that if $R_2$ is other than hydrogen, $R_1$ and $R_2$ are the same;

$R_3$ is



(i)

wherein $R_4$ is hydrogen, halogen, alkyl, alkoxy or nitro, or

(ii)

and n is 1,2,3 or 4.

---

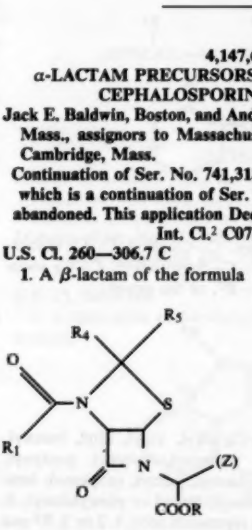
**4,147,699**

## α-LACTAM PRECURSORS OF PENICILLIN AND CEPHALOSPORIN ANTIBIOTICS

**Jack E. Baldwin, Boston, and Andrew T. Au, Somerville, both of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.**

**Continuation of Ser. No. 741,313, Nov. 11, 1976, abandoned, which is a continuation of Ser. No. 567,046, Apr. 10, 1975, abandoned. This application Dec. 29, 1977, Ser. No. 865,638**
**Int. Cl.² C07D *275/04***
**U.S. Cl. 260—306.7 C** **4 Claims**

1. A β-lactam of the formula



wherein R is a carboxyl protective organic group, $R_1$ is $C_1$–$C_7$ alkyl, phenyl, halophenyl lower alkylphenyl, lower alkoxyphenyl, hydroxyphenyl, 5'amino-5'carboxyvaleramido, 5'-protected amino-5'-carboxyvaleramido, carbobenzyloxy, carbotrichloroethyloxy or trifluoroacetyl,

Z has a formula selected from the group consisting of:

Formula A

Formula B

and

Formula C

$R_2$ and $R_3$ are hydrogen, $C_1$ to $C_4$ alkyl or $C_1$ to $C_4$ alkoxy, or hydroxymethyl;

$R_4$ and $R_5$ are $C_1$ to $C_4$ alkyl;

$R_6$ is hydrogen, an ester derivative of hydroxy, hydroxy, benzoyloxy, or halide;

and $R_7$ is hydroxyl, hydrogen, $C_1$ to $C_4$ alkyl or $C_1$ to $C_4$ alkoxy.

---

**4,147,700**

**TRIAZOLYLBENZOPHENONE DERIVATIVES AND PRODUCTION THEREOF**

**Kentaro Hirai, Kyoto; Toshio Fujishita, Nishinomiya; Teruyuki Ishiba, Takatsuki, and Hirohiko Sugimoto, Ikeda, all of Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan**

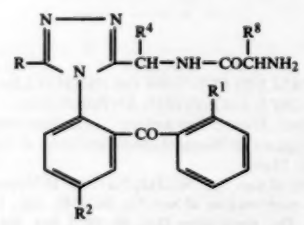
**Division of Ser. No. 722,670, Sep. 13, 1976, abandoned, which is a continuation of Ser. No. 718,934, Aug. 30, 1976, abandoned. This application Dec. 15, 1977, Ser. No. 861,011**

**Claims priority, application United Kingdom, Dec. 30, 1975, 53224/75**

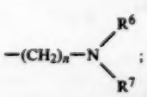
**Int. Cl.[2] C07D *249/14***

**U.S. Cl. 260—308 R** **1 Claim**

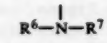
1. A process for preparing a compound of the formula:



wherein R represents hydrogen, $C_1$–$C_6$ alkyl, $C_1$–$C_6$ chloro-alkyl, $C_1$–$C_6$ bromo-alkyl, $C_1$–$C_6$ fluoro-alkyl, $C_1$–$C_6$ iodo-alkyl, the group - $(CH_2)_n$—X—$R^5$, or the group

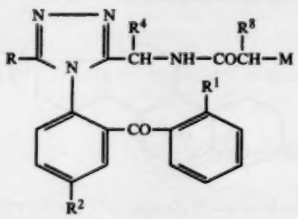


$R^5$ represents hydrogen, $C_1$–$C_6$ alkyl, vinyl, allyl, butenyl, pentenyl, hexenyl, ethynyl, propynyl, butynyl, pentynyl, phenyl, tolyl, xylyl, pyridyl, formyl, acetyl, propionyl, benzoyl, carbobenzoxy, glycyl, alanyl, leucyl or phenylalanyl; X represents sulfur or oxygen; n represents zero, 1, 2 or 3; $R^6$ and $R^7$ each represents hydrogen or $C_1$–$C_6$ alkyl; or the group



represents pyrrolidino; $R^1$ represents hydrogen or halogen; $R^2$ represents halogen, nitro, or trifluoromethyl; $R^4$ and $R^8$ each represents hydrogen, $C_1$–$C_6$ alkyl, or $C_7$–$C_{10}$ aralkyl,

which comprises hydrazinolyzing a phthalyl derivative of the formula:



wherein M represents phthalimido and R, $R^1$, $R^2$, $R^4$ and $R^8$ each is as defined above

in an inert solvent.

---

**4,147,701**

**7-ACYLAMINO-3-(1-CARBOXYMETHYLTHIOETHYL-TETRAZOLYL-5-THIOMETHYL)-3-CEPHEM-4-CARBOXYLIC ACIDS**

**David A. Berges, Wayne, Pa., assignor to SmithKline Corporation, Philadelphia, Pa.**

**Division of Ser. No. 719,751, Sep. 2, 1976, Pat. No. 4,057,631. This application Nov. 2, 1977, Ser. No. 847,871**

**Int. Cl.[2] C07D *257/04***

**U.S. Cl. 260—308 D** **1 Claim**

1. 1-Carboxymethylthioethyltetrazole-5-thiol.

---

**4,147,702**

**1,4-DIOXANE POLYCARBOXYLATES**

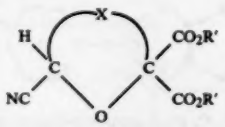
**Marvin M. Crutchfield, Creve Coeur, Mo., and Kent P. Lannert, Freeburg, Ill., assignors to Monsanto Company, St. Louis, Mo.**

**Division of Ser. No. 756,946, Jan. 5, 1977. This application Jul. 27, 1978, Ser. No. 928,331**

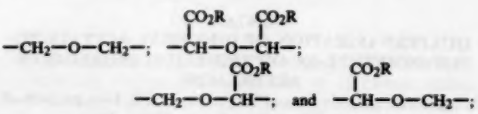
**Int. Cl.[2] C07D *319/10***

**U.S. Cl. 260—340.6** **2 Claims**

1. A compound of the formula:



wherein X is selected from the group consisting of:



and R' is lower alkyl.

---

**4,147,703**

**PROCESS TO PRODUCE 8-METHOXYPSORALEN**

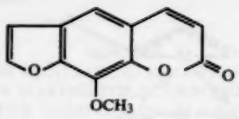
**Arnold A. Liebman, Verona, and Yu-Ying Liu, Westwood, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.**

**Division of Ser. No. 820,265, Jul. 29, 1977, Pat. No. 4,107,182. This application Mar. 8, 1978, Ser. No. 884,783**

**Int. Cl.[2] C07D *493/04***

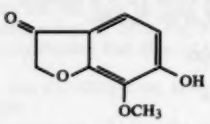
**U.S. Cl. 260—343.21** **1 Claim**

1. A process to produce a compound of the formula



which comprises

(A) reacting a compound of the formula



with hydrogen and a Noble metal in acetic acid

(B) reacting the product of (A) with a mixture of zinc cyanide and hydrochloric acid;

(C) reacting the product of (B) with dichlorodicyanoquinone in an inert solvent;

(D) reacting the product of (C) with ethyl cyanoacetate in a polar solvent;

(E) decarboxylating the product of (D) to yield the final product.

---

**4,147,704**

## DERIVATIVES OF NOVOBIOCIN

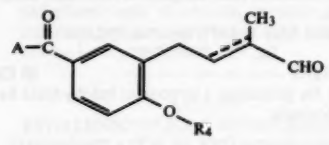
**Lester A. Dolak, Cooper Township, Kalamazoo County, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.**

**Division of Ser. No. 793,822, May 5, 1977. This application Feb. 15, 1978, Ser. No. 878,117**

**Int. Cl.[2] C07D *311/56***

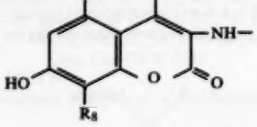
**U.S. Cl. 260—343.45** **6 Claims**

1. An aldehyde novobiocin-type compound of the formula:



IIIa

or a pharmaceutically acceptable salt thereof where A is ring B



where $R_5$ and $R_8$ may be the same or different and are selected from the group consisting of hydrogen, alkyl of 1 thru 5 carbon atoms, halogen, nitro, cyano, carboxyl and $—NR_\alpha R_\beta$ where $R_\alpha$ and $R_\beta$ may be the same or different and are hydrogen or alkyl of 1 thru 5 carbon atoms; is a single or double bond; and $R_4$ is hydrogen.

---

**4,147,705**

## PREPARATION OF GAMMA-PYRONES

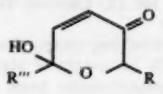
**Thomas M. Brennan, Old Lyme; Daniel P. Brannegan, Pawcatuck; Paul D. Weeks, and Donald E. Kuhla, both of Gales Ferry, all of Conn., assignors to Pfizer Inc., New York, N.Y.**

**Division of Ser. No. 721,885, Sep. 9, 1976, Pat. No. 4,082,717, which is a continuation-in-part of Ser. No. 710,901, Aug. 2, 1976, abandoned. This application Jan. 16, 1978, Ser. No. 869,493**

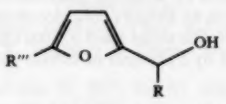
**Int. Cl.[2] C07D *309/22***

**U.S. Cl. 260—345.9 R** **2 Claims**

1. A process for preparing a compound of the formula



which comprises contacting a furfuryl alcohol of the formula



wherein R is hydrogen, alkyl of 1 to 4 carbon atoms, phenyl or benzyl and R''' is hydrogen or alkyl of 1 to 4 carbon atoms in aqueous solution with one equivalent of a halogen oxidant selected from the group consisting of chlorine, bromine, bromine chloride, hypochlorous acid, hypobromous acid or mixtures thereof at a temperature of −50° to 50° C. until the reaction is substantially complete.

---

**4,147,706**

## INTERMEDIATES FOR POLYCYCLIC QUINONOID ANTIBIOTICS

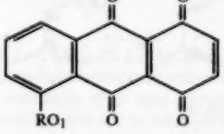
**Andrew S. Kende, Pittsford; John E. Mills, Rochester, both of N.Y., and Yuh-Geng Tsay, Taichung, Taiwan, assignors to Research Corporation, New York, N.Y.**

**Division of Ser. No. 632,939, Nov. 18, 1975, Pat. No. 4,070,382. This application Jan. 10, 1978, Ser. No. 868,373**

**Int. Cl.[2] C07C *87/10***

**U.S. Cl. 260—365** **19 Claims**

1. A derivative of 5-hydroxy quinizarinquinone having the formula



wherein $R_1$ is a lower alkyl or lower alkanoyl of 1–5 carbon atoms; phenyl, phenyl carbonyl, substituted phenyl-lower alkyl, or lower alkanoyl, wherein the substituent groups are lower alkyl, lower alkoxy, each containing 1–5 carbon atoms, or halo; and the lower alkyl, lower alkanoyl moieties contain 1–5 carbon atoms.

## 4,147,707
## GLASS FIBER-REINFORCED POLYCARBONATES WITH IMPROVED MECHANICAL PROPERTIES CONTAINING 0.5 TO 5.0% OF ORGANOPOLYSILOXANE

**Wolfgang Alewelt; Dieter Margotte; Hugo Vernaleken, and Horst-Günter Kassahn, all of Krefeld, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Filed Apr. 21, 1976, Ser. No. 679,108**

**Claims priority, application Fed. Rep. of Germany, Apr. 24, 1975, 2518287**

**Int. Cl.[2] C08L *69/00***

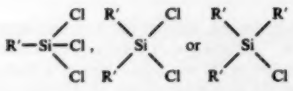
**U.S. Cl. 260—37 SB** **2 Claims**

1. Thermoplastic moulding compositions consisting of

A. about 45–89.5% by weight of high molecular weight, thermoplastic polycarbonates based on diphenols having weight-average molecular weights, $\overline{M}_w$, between about 10,000 and 100,000,

B. about 10–50% by weight of glass fibers, and

C. about 0.5–5% by weight of organopolysiloxanes having a viscosity between about 5 and 300,000 cSt at 20° C. which are obtained by hydrolysis or cohydrolysis of the monomers



in which

R', which may be the same or different, is H, $C_1$–$C_6$ alkyl or phenyl, and the sum of the percentages by weight of A+B+C being 100 in each case.

---

## 4,147,708
## PREPARATION OF CAROTENOIDS USING A π-ALLYL COMPLEX

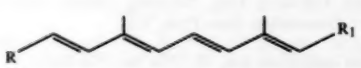
**Percy S. Manchand, Montclair, N.J., assignor to Hoffmann-La Roche Inc., Nutley, N.J.**

**Continuation-in-part of Ser. No. 627,435, Oct. 30, 1975, abandoned. This application May 2, 1977, Ser. No. 793,220**

**Int. Cl.[2] C11C *1/00*; C07C *27/00, 43/20***

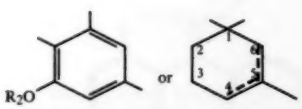
**U.S. Cl. 260—413** **13 Claims**

1. A process for the preparation of a compound of the formula

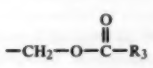


wherein

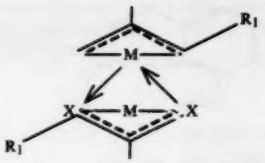
R is



$R_1$ is $-CH_2OH$, or



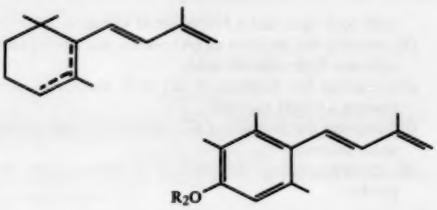
$R_2$ and $R_3$ are lower alkyl the dotted line is a carbon-carbon bond which may be in either the 4,5 or 5,6 position; which comprises reacting a compound of the formula



wherein M is Pd or Pt, X is halogen; with a compound of the formula

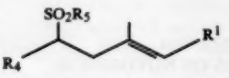
$R_4-CH_2SO_2R_5$

wherein $R_4$ is



and

$R_5$ is lower alkyl, aryl or lower alkylaryl and the dotted line is a carbon to carbon bond in either the 4,5 or 5,6 position; under basic conditions in the presence of a ligand or a solvent capable of coordinating with the platinum or palladium to form a compound having the formula



wherein $R_1$, $R_4$ and $R_5$ are as defined above followed by treatment of said compound with a base.

---

## 4,147,709
## ZIRCONIUM HALOHYDRIDE PREPARATION

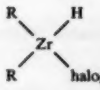
**Gary J. Lynch, St. Louis, Mo., assignor to Monsanto Company, St. Louis, Mo.**

**Filed May 2, 1977, Ser. No. 793,003**

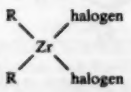
**Int. Cl.[2] C07F *7/00***

**U.S. Cl. 260—429.3** **10 Claims**

1. A process for preparing a zirconium halohydride having the structural formula



wherein each R is a π-cyclopentadienyl radical, which process comprises reacting a zirconium dihalide having the structural formula



wherein each R has the aforedescribed significance with molecular hydrogen in the presence of an unreacted metal from Group Ia of the Periodic Table of the Elements in a solvent for the dihalide that does not prevent formation of said halohy-

dride and at a temperature below that at which the halohydride decomposes.

---

4,147,710

## COMPOUNDS CONTAINING PHOSPHOROUS AND A METHOD FOR MAKING POLYCARBODIIMIDE FOAMS WITH THE COMPOUNDS AS A CATALYST

Andrea La Spina, Garbagnate Milanese, Italy; Werner Dietrich, and Reinhard Schliebs, both of Cologne, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

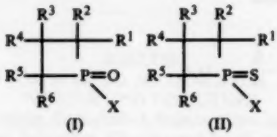
Division of Ser. No. 498,788, Aug. 19, 1974, Pat. No. 3,931,059. This application Sep. 23, 1975, Ser. No. 616,103

Claims priority, application Fed. Rep. of Germany, Aug. 21, 1973, 2342148

Int. Cl.[2] C07F *3/06, 9/28*

U.S. Cl. 260—429.9 3 Claims

1. An addition compound which is the reaction product of (a) a phosphetane oxide or phosphetane sulphide of the formulae I and II:



(I) (II)

wherein X is selected from the group consisting of $C_1$–$C_{18}$ alkyl, $C_2$–$C_{18}$ alkenyl, $C_6$–$C_{14}$ aryl, $C_7$–$C_{20}$ aralkyl, $C_1$–$C_{18}$ alkoxy and $C_6$–$C_{14}$ aroxy, and wherein $R^1$ to $R^6$ are selected from the group consisting of hydrogen and $C_1$–$C_4$ alkyl, and

(b) a compound selected from the group consisting of

(i) aliphatic mono- di- and polyhydric alcohols having molecular weights of from about 32 to about 250,

(ii) protonic acids having pH's of between 1 and 8 in N/10 aqueous solution,

(iii) metal salts selected from the group consisting of zinc chloride, tin (II) bromide, tin (IV) chloride, magnesium chloride, calcium chloride, lithium chloride, lithium iodide, cadmium chloride, manganese (II) chloride, zinc acetate, vanadium oxythrichloride, and aluminum chloride, and

(iv) acid chlorides selected from the group consisting of phosphorous (III) chloride, phosphorous oxytribromide, phosphorous oxychloride, antimony (V) chloride, silicon (IV) chloride, methyl trichlorosilane, methane phosphonic acid dichloride, methane sulphonic acid chloride, p-toluene sulphonic acid chloride, and 1-chloro-1-oxophospholine.

---

4,147,711

## ETHYLENIC SILICON COMPOUNDS AND THERMOPLASTIC ELASTOMERS OBTAINED THEREFROM

Michel Bargain, Lyon, and Marcel Lefort, Caluire, both of France, assignors to Rhone-Poulenc Industries, Paris, France

Division of Ser. No. 617,513, Sep. 29, 1975, Pat. No. 4,088,670. This application Nov. 16, 1977, Ser. No. 851,898

Claims priority, application France, Oct. 1, 1974, 74 33041; Feb. 11, 1975, 75 04191; Feb. 11, 1975, 75 04192

Int. Cl.[2] C07F *7/10*

U.S. Cl. 260—448.2 N 4 Claims

1. An organosilicon compound of the formula:

$$(R)_n\text{—}\underset{\displaystyle (R_1)_{3-n}}{\overset{|}{\text{Si}}}\text{—}R_2\text{—}X\text{—}[\text{—}G(Y)_m] \qquad \text{(I)}$$

in which

n is 1, 2 or 3;

each R, which may be identical or different, is a monovalent organic group which contains an ethylenic carbon-carbon double bond and from 2 to 10 carbon atoms;

each $R_1$, which may be identical or different, is a straight or branched alkyl radical optionally substituted by one or more halogen atoms or cyano groups; an aryl radical or an alkylaryl radical optionally substituted by one or more halogen atoms;

$R_2$ is a straight or branched divalent alkylene or alkylidene radical possessing up to 4 carbon atoms; and

—X—$G(Y)_m$] represents a —O—$C_6H_4$—$NO_2$ or —O—$C_6H_4$—$NH_2$ radical.

---

4,147,712

## AMINO SUBSTITUTED MERCAPTO ORGANOSILICON COMPOUNDS

Thomas C. Williams, Ridgefield, Conn., and George E. Totten, Hartsdale, N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Filed Jun. 28, 1977, Ser. No. 810,840

Int. Cl.[2] C07F *7/10, 7/18*

U.S. Cl. 260—448.8 R 24 Claims

1. An amino substituted mercapto organosilicon composition of matter selected from the class consisting of (i) amino substituted mercapto organosilanes having the formula

$$X_{4-(a+b)}\text{—}\underset{\displaystyle R'_b}{\overset{|}{\text{Si}}}\text{—}[(R)_n(Q)_tCH(SH)CH_2Z]_a \qquad \text{(I)}$$

wherein R' is a monovalent hydrocarbon radical selected from the class consisting of hydrogen, hydrocarbon radicals and substituted hydrocarbon radicals.

wherein X is a hydrolyzable radical selected from the class consisting of alkoxy, aryloxy, acyloxy, secondary amino and aminooxy radicals;

wherein R is a divalent bridging group selected from the class consisting of hydrocarbon radicals, groups of the formula —R"OR"— and groups of the formula —R"SR"—, wherein R" is a divalent hydrocarbon radical;

wherein Q is an oxygen atom or a sulfur atom;

wherein Z is a monovalent organic amino radical, the nitrogen atom of which is directly bonded to the carbon atom of the $(CH_2)$ group of the formula;

wherein n has a value of 0 or 1, and t has a value of 0 or 1, with the proviso that when n is 0 then t is 0;

wherein a has a value of 1 to 3 and b has a value of 0 and 2, with the proviso that the sum of (a+b) is not greater than 3; (ii) amino substituted mercapto organosiloxane homopolymers consisting essentially of siloxy units having the formula

$$R'_b\text{—}\underset{\displaystyle O_{4-\frac{(a+b)}{2}}}{\overset{|}{\text{Si}}}\text{—}[(R)_n(Q)_tCH(SH)CH_2Z]_a \qquad \text{(II)}$$

wherein R', R, Q, Z, n, t, a and b are the same as defined above; and (iii) amino substituted mercapto organosiloxane copolymers consisting essentially of at least one siloxy unit represented by formula (II) above and at least one siloxy unit represented by the formula

$$R'_cSiO_{\frac{4-c}{2}} \qquad \text{(III)}$$

wherein R' is the same as defined in formula (II) above and wherein c has a value of from 0 to 3 inclusive.

4,147,713

## PROCESS FOR THE PRODUCTION OF HALOHYDRIN REACTION PRODUCTS UTILIZING CYANIDE SILICATE COMPOUNDS

David H. Blount, 5450 Lea St., San Diego, Calif. 92105

Continuation-in-part of Ser. No. 835,902, Sep. 23, 1977, Pat. No. 4,083,938, and a continuation-in-part of Ser. No. 801,819, May 31, 1977, Pat. No. 4,086,326, which is a continuation-in-part of Ser. No. 757,960, Jan. 10, 1977, abandoned. This application Feb. 1, 1978, Ser. No. 874,255

Int. Cl.[2] C07F *7/04, 7/18, 7/10*

U.S. Cl. 260—448.8 R 20 Claims

1. The process for the production of poly (halohydrin cyanide silicate) reaction products by the following steps:

(a) adding 1 to 2 mols of an alkali metal cyanide compound;

(b) admixing about 1 mol of an oxidated silicon acid;

(c) heating the mixture to just above the melting temperature of the alkali metal cyanide compound while agitating at ambient pressure for 10 to 30 minutes, thereby

(d) producing a mixture of alkali metal cyanide silicate compounds;

(e) adding 0 to 2 mols of an epoxide catalyst;

(f) adding 1 to 4 mols of a halohydrin compound;

(g) keeping the temperature between ambient and the boiling temperature of the reactants while agitating for 5 to 90 minutes, thereby

(h) producing poly (halohydrin cyanide silicate) reaction product.

---

4,147,714

## PROCESS FOR THE PREPARATION OF POLYISOCYANATES WHICH CONTAIN BIURET GROUPS

Hartmut Hetzel, Cologne; Klaus König, Leverkusen; Hans G. Schmelzer, Stommeln, and Kuno Wagner, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Continuation of Ser. No. 771,292, Feb. 23, 1977, abandoned. This application May 12, 1978, Ser. No. 905,245

Claims priority, application Fed. Rep. of Germany, Mar. 10, 1976, 2609995

Int. Cl.[2] C07C *127/24*

U.S. Cl. 260—453 AB 7 Claims

1. A process for the preparation of polyisocyanates having biuret groups by the reaction of aliphatic diamines containing from 2 to 12 carbon atoms with aliphatic diisocyanates containing from 4 to 12 carbon atoms which are free from biuret groups at a molar ratio of $NH_2$/NCO between about 1:5 and 1:100, characterized in that the diamines are reacted in vapor form with the diisocyanates which are heated to a temperature from about 100° C. to 250° C.

---

4,147,715

## THIOCARBAMATE PREPARATION UTILIZING QUATERNARY AMMONIUM SALT CATALYSTS

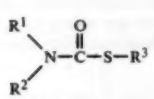
Harry Tilles, El Cerrito, and Paul E. Hoch, Moraga, both of Calif., assignors to Stauffer Chemical Company, Westport, Conn.

Filed Mar. 23, 1978, Ser. No. 889,175

Int. Cl.[2] C07C *153/09;* C07D *207/24, 211/06;* C07C *87/30*

U.S. Cl. 260—455 A 12 Claims

1. A process for the manufacture of a thiocarbamate of the formula



in which

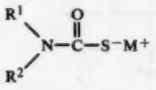
$R^1$ and $R^2$ are independently selected from the group consisting of the following substituted or unsubstituted groups; $C_1$–$C_{12}$ alkyl, $C_2$–$C_8$ alkenyl, $C_3$–$C_6$ alkynyl, phenyl, $C_7$–$C_{10}$ phenylalkyl, $C_3$–$C_7$ cycloalkyl, $C_5$–$C_7$ cycloalkenyl, $C_2$–$C_8$ alkoxyalkyl, $C_2$–$C_8$ alkylthioalkyl, $C_3$–$C_8$ alkoxyalkenyl, and $C_3$–$C_8$ alkylthioalkenyl; wherein the substituents are independently selected from the group consisting of halo, cyano, nitro, trifluoromethyl, $C_1$–$C_4$ alkyl, and $C_1$–$C_4$ alkoxy, or

$R^1$ and $R^2$ together with the nitrogen atom to which they are bound form a member selected from the group consisting of pyrryl, pyridyl, and $C_2$–$C_6$ polyalkyleneimine; and

$R^3$ is selected from the group consisting of the following substituted or unsubstituted groups: $C_1$–$C_{12}$ alkyl, $C_2$–$C_8$ alkenyl, $C_3$–$C_6$ alkynyl, phenyl, $C_7$–$C_{10}$ phenylalkyl, $C_3$–$C_7$ cycloalkyl, $C_5$–$C_7$ cycloalkenyl, $C_2$–$C_8$ alkoxyalkyl, $C_2$–$C_8$ alkylthioalkyl, $C_3$–$C_8$ alkoxyalkenyl, and $C_3$–$C_8$ alkylthioalkenyl; wherein the substituents are independently selected from the group consisting of halo, cyano, nitro, trifluoromethyl, $C_1$–$C_4$ alkyl, and $C_1$–$C_4$ alkoxy;

which comprises

(a) reacting an aqueous solution of a thiocarbamate salt of the formula



in which $R^1$ and $R^2$ are as defined above and $M^+$ is a cation selected from the group consisting of a alkali or alkaline earth metal ion, the ion $R^1R^2NH_2^+$, and a trialkylammonium ion in which the alkyl groups each contain 1–4 carbon atoms, with an organic halide of the formula

$R^3X$

in which $R^3$ is as defined above and X is chlorine or bromine, in the presence of a catalytic amount of a quaternary ammonium salt having the formula

$(R^4R^5R^6R^7N)^+Y^-$

in which $R^4$ and $R^5$ are independently selected from the group consisting of $C_1$–$C_{25}$ alkyl and $C_2$–$C_{25}$ alkenyl, $R^6$ and $R^7$ are independently selected from the group consisting of $C_6$–$C_{25}$ alkyl and $C_6$–$C_{25}$ alkenyl, and $Y^-$ is an anion selected from the group consisting of chloride and bromide; and

(b) separating said thiocarbamate from said aqueous solution.

---

4,147,716

## PREPARATION OF N-SUBSTITUTED CARBAMATES

Rack H. Chung, Stormville, N.Y., assignor to BASF Wyandotte Corporation, Wyandotte, Mich.

Filed Jun. 5, 1978, Ser. No. 912,461

Int. Cl.[2] C07C *125/04*

U.S. Cl. 260—465 D 11 Claims

1. A method of preparing an N-substituted carbamate comprising reacting by heating in sulfolane at a temperature ranging from about 65° C. to about 100° C. (1) an alkali metal cyanate, (2) at least one sulfolane-soluble organic halide of the formula RX wherein X is halogen and R represents a radical selected from the group consisting of alkyl, alkenyl, aralkyl and aralkenyl, and (3) at least one sulfolane-soluble non-aromatic monohydric or polyhydric alcohol, and isolating the N-substituted carbamate thereby produced from the resulting reaction mass.

4,147,717

## PROCESS FOR PURIFYING ADIPONITRILE

Bernard J. Kershaw, Kingston, Canada, assignor to Du Pont of Canada Limited, Montreal, Canada

Continuation-in-part of Ser. No. 717,909, Aug. 26, 1976, abandoned. This application Dec. 8, 1977, Ser. No. 858,663

Int. Cl.[2] C07C *121/26*

U.S. Cl. 260—465.8 R 6 Claims

1. A process for substantially reducing the level of N-heterocyclic amines in adiponitrile made from adipic acid and ammonia comprising contacting said adiponitrile essentially free of ammonia with a solid acidic sorption agent while minimizing the hydrolyses of any 2-cyanocyclopentylideneimine present in the adiponitrile, said sorption agent and temperature of contact being selected from the class consisting of (1) weak-acid cation exchange resins at 20°–140° C., (2) boron phosphate at 20°–100° C. (3) bentonite at 20°–100° C. and (4) molecular sieves at 100°–250° C. with said process being conducted in the presence of less than 0.1% by weight of water when molecular sieves comprise said sorption agent.

---

4,147,718

## METHOD FOR MAKING METHACRYLIC ACID, ITS NITRILE AND ITS ESTERS

Wolfgang Gaenzler, Darmstadt-Arheilgen; Klaus Kabs, Seeheim, and Guenter Schroeder, Ober-Ramstadt, all of Fed. Rep. of Germany, assignors to Rohm GmbH, Darmstadt, Fed. Rep. of Germany

Filed Jan. 16, 1978, Ser. No. 869,605

Claims priority, application Fed. Rep. of Germany, Jan. 20, 1977, 2702187

Int. Cl.[2] C07C *121/32, 57/04, 69/54*

U.S. Cl. 260—465.9 6 Claims

1. The method of making a compound of the formula

$$CH_2=\overset{CH_3}{\overset{|}{C}}-X$$

which comprises reacting methylal with a compound of the formula $CH_3CH_2X$, where X is carboxyl, cyano, or a carboxylic acid ester group inert under the reaction conditions, at a temperature between 250° C. and 500° C. in the presence of a catalyst system which consists essentially of (1) 10 to 70 percent by weight of silicon dioxide dosed with a basic compound of a metal of Group IA or Group IIA of the Periodic System and (2) to 30 percent by weight of a member selected from the group consisting of titanium dioxide and thermally pretreated aluminum oxide.

---

4,147,719

## PROCESS FOR PRODUCING N-PHOSPHONOMETHYLGLYCINE SALTS

John E. Franz, Crestwood, Mo., assignor to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 753,232, Dec. 20, 1976, abandoned. This application Jul. 21, 1978, Ser. No. 926,681

Int. Cl.[2] C07F *9/38*

U.S. Cl. 260—501.12 17 Claims

1. Process for preparing a mono or di salt of N-phosphonomethylglycine wherein the salt-forming cation is selected from the group consisting of cations of alkali metals, alkaline earth metals, ammonium and organic ammonium, provided that when the organic group is aryl, the ammonium salt is a primary amine salt, which comprises contacting, at superatmospheric pressure, an aqueous solution of a corresponding mono or di salt of N-phosphonomethyliminodiacetic acid with an oxygen-containing gas in the presence of an oxidation catalyst which is platinum on activated carbon.

4,147,720

## PROCESS FOR PREPARING ALIPHATIC DIPEROXYDICARBOXYLIC ACIDS

Sidney Berkowitz, Highland Park, N.J., assignor to FMC Corporation, Philadelphia, Pa.

Filed Dec. 30, 1977, Ser. No. 866,091

Int. Cl.[2] C07G *179/10*

U.S. Cl. 260—502 R 44 Claims

1. A process for preparing a saturated $C_6$–$C_{16}$ aliphatic diperoxydicarboxylic acid which comprises the steps of bringing together and reacting, a saturated $C_6$–$C_{16}$ aliphatic dicarboxylic acid and hydrogen peroxide in a phosphoric acid reaction medium in a reaction zone, wherein the molecular ratio of said dicarboxylic acid and hydrogen peroxide is within the range of from about 1:2 to about 1:5, whereby there is formed a reaction slurry in said reaction zone, the amount of phosphoric acid employed being sufficient to provide an easily stirrable reaction mixture and to predissolve the dicarboxylic acid reactant at temperatures between about 60°–100° C.; maintaining the reaction slurry in an agitated condition; maintaining the temperature of the reaction slurry within the range of from about 20° to about 70° C. during the reaction period and thereafter separating the diperoxydicarboxylic acid from the reaction slurry.

19. A process for preparing a saturated $C_{12}$–$C_{16}$ aliphatic diperoxydicarboxylic acid which comprises the steps of bringing together and reacting, a saturated $C_{12}$–$C_{16}$ aliphatic dicarboxylic acid and hydrogen peroxide in a phosphoric acid reaction medium containing up to about 5% by weight of the phosphoric acid of a stronger acid selected from the group consisting of sulfuric acid, methanesulfonic acid, trifluromethanesulfonic acid and toluenesulfonic acid, in a reaction zone wherein the molecular ratio of said dicarboxylic acid and hydrogen peroxide is within the range of from 1:2 to about 1:5, whereby there is formed a reaction slurry in said reaction zone, the amount of phosphoric acid employed being sufficient to provide an easily stirrable reaction mixture and to predissolve the dicarboxylic acid reactant at temperatures between about 60°–100° C.; maintaining the reaction slurry in an agitated condition; maintaining the temperature of the reaction slurry within the range of from about 20° to about 70° C. during the reaction period and thereafter separating the diperoxydicarboxylic acid from the reaction slurry.

---

4,147,721

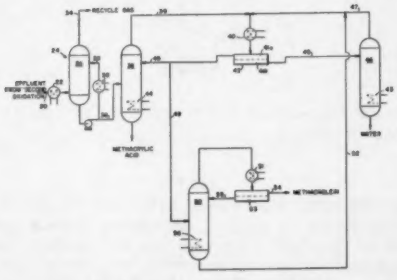
## PROCESS FOR RECOVERING METHACRYLIC ACID

James Leacock, New York, N.Y., assignor to Halcon Research and Development Corporation, New York, N.Y.

Filed Apr. 6, 1978, Ser. No. 894,062

Int. Cl.[2] B01D *3/36;* C07C *57/04, 51/42*

U.S. Cl. 562—532 12 Claims



1. In a process for the preparation of methacrylic acid by the vapor phase catalytic oxidation of methacrolein in the presence of molecular oxygen, water vapor, and inert gases, the recovery of methacrylic acid from the effluent vapors from said oxidation by: (a) cooling and condensing said effluent to a pre-determined temperature and thereby forming a vapor portion comprising substantially unreacted methacrolein and

inert gases and a liquid portion comprising substantially methacrylic acid, acetic acid, water, a minor amount of unreacted methacrolein, and impurities; (b) separating said liquid portion of (a) from said vapor portion of (a) and azeotropically distilling at a sub-atmospheric pressure said liquid portion in the presence of a solvent selected from the group consisting of methyl n-propyl ketone, methyl ethyl ketone, methyl isobutyl ketone, methyl isopropyl ketone, diethyl ketone, ethyl isopropyl ketone, ethyl tertiary amyl ether, methyl tertiary amyl ether, n-propyl ether, and mixtures thereof, the overhead product from said distillation comprising substantially an azeotrope of said solvent and water and a minor amount of unreacted methacrolein and the bottom product therefrom being substantially free of water and comprising said methacrylic acid, acetic acid, and impurities.

---

**4,147,722**

## MONO-, BIS- AND TRIS-SULPHENYL CHLORIDES

**Ernst Roos, Odenthal-Osenau, Fed. Rep. of Germany, assignor to Bayer Aktiengesellschaft, Fed. Rep. of Germany**

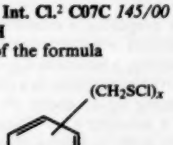
**Filed May 13, 1975, Ser. No. 577,074**

**Claims priority, application Fed. Rep. of Germany, May 18, 1974, 2424248**

**Int. Cl.[2] C07C *145/00***

**U.S. Cl. 260—543 H** **6 Claims**

1. A compound of the formula



wherein x is 1 to 3 and y is 6–x.

---

**4,147,723**

## 2-(MERCAPTO)-N,N'-p-PHENYLENEBISSULFONAMIDES

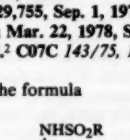
**Joseph E. Dunbar, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.**

**Division of Ser. No. 829,755, Sep. 1, 1977, Pat. No. 4,098,889. This application Mar. 22, 1978, Ser. No. 888,891**

**Int. Cl.[2] C07C *143/75, 143/79***

**U.S. Cl. 260—556 A** **4 Claims**

1. A compound of the formula



wherein R represents an alkyl having from 1 to about 3 carbon atoms or phenyl.

---

**4,147,724**

## PROCESS FOR THE PREPARATION OF POLYAMINES

**Hartmut Knöfel, Leverkusen, and Günther Ellendt, Krefeld, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen Bayerwerk, Fed. Rep. of Germany**

**Filed Dec. 17, 1976, Ser. No. 751,625**

**Claims priority, application Fed. Rep. of Germany, Dec. 19, 1975, 2557501**

**Int. Cl.[2] C07C *85/145***

**U.S. Cl. 260—570 D** **5 Claims**

1. A process for the preparation of multinuclear aromatic polyamines by condensation of aromatic amines with formaldehyde in the presence of aqueous acid catalysts in a condensation reaction carried out in at least two stages, followed by neutralization of the catalyst and recovery of aromatic polyamines, characterized in that free amine is removed from the condensation reaction mixture by means of a hydrophobic solvent after the first condensation stage and before the final condensation stage, and the amine thus removed is returned to the aqueous, catalyst-containing phase by returning the resulting amine-containing solvent phase to said aqueous phase before the first condensation stage.

---

**4,147,725**

## PROCESS FOR PREPARING ANILINE COMPOUNDS FROM AMIDES WITH RHODIUM

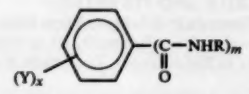
**Kathryn A. Eickholt, Midland, and Robert H. Grubbs, East Lansing, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed Mar. 22, 1978, Ser. No. 888,892**

**Int. Cl.[2] C07C *85/12;* B01J *23/74***

**U.S. Cl. 260—578** **9 Claims**

1. An improved, vapor-phase process for preparing aniline or a substituted aniline, the process comprising contacting a compound of the formula



(I)

wherein R is hydrogen or methyl, Y is an inert-substituent, m is an integer of 1 or 2 and x is an integer of 0–3, with a metal catalyst, the improvement wherein the metal catalyst is rhodium.

---

**4,147,726**

## ACID-CATALYZED HYDROLYSIS OF ORGANIC HYDROPEROXIDE EMPLOYING A POLAR SOLVENT AND PHENOL AS REACTION MEDIUM

**Yulin Wu, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.**

**Filed Nov. 8, 1976, Ser. No. 739,905**

**Int. Cl.[2] C07C *37/08, 45/00***

**U.S. Cl. 260—586 R** **12 Claims**

1. A process for the acid-catalyzed hydrolysis of an organic hydroperoxide which comprises conducting the hydrolysis in a reaction medium comprising phenol and at least one material selected from a low boiling or low molecular weight alcohol and sulfolane.

---

**4,147,727**

## 1-BUTENOYL-3,3-DIMETHYLCYCLOHEXANE MIXTURES

**Mark A. Sprecker, Sea Bright; Manfred H. Vock, Locust; Frederick L. Schmitt, Holmdel; John B. Hall, Rumson, and James M. Sanders, Eatontown, all of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.**

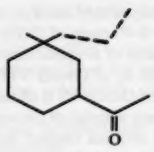
**Division of Ser. No. 740,948, Nov. 11, 1976, Pat. No. 4,081,481, which is a continuation-in-part of Ser. No. 713,357, Aug. 11, 1976, Pat. No. 4,062,894. This application Nov. 15, 1977, Ser. No. 851,726**

**The portion of the term of this patent subsequent to Apr. 3, 1996, has been disclaimed.**

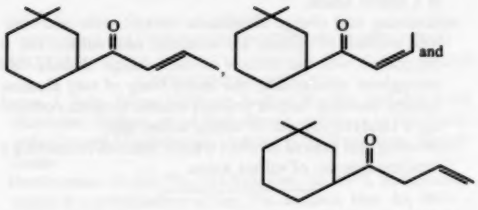
**Int. Cl.[2] C07C *49/61***

**U.S. Cl. 260—586 R** **1 Claim**

1. A mixture of 1-butenoyl-3,3-dimethylcyclohexanes represented by the structure:



wherein said mixture consists of compounds having the structure:




and wherein one of the dashed lines represents a carbon-carbon single bond and the other of the dashed lines represents a carbon-carbon double bond.

---

4,147,728

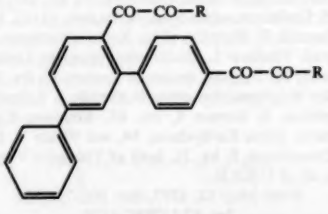
## DISUBSTITUTED META-TERPHENYL COMPOUNDS AND RESULTING POLYMERS

Guy Rabilloud, and Bernard Sillion, both of Grenoble, France, assignors to Institut Francais du Petrole, Cedex, France France,

Filed Dec. 18, 1974, Ser. No. 533,822
Claims priority, application France, Dec. 19, 1973, 73 45637
Int. Cl.[2] C07C *49/78*
U.S. Cl. 260—590 D 4 Claims

1. A member selected from the group consisting of a 4,4'-disubstituted meta-terphenyl derivative of the formula:

a 4',4''-disubstituted meta-terphenyl derivative of the formula:




in which R is phenyl, and a mixture of both of said meta-terphenyl derivatives.

4,147,729

## 1-(3-BENZOYLPHENYL)-PROPINE AND PROCESS FOR THE PREPARATION THEREOF

Boris Zupančič, Ljubljana, and Branko Jenko, Ljubljana-Polje, both of Yugoslavia, assignors to LEK tovarna farmacevtskih ibn kemicnih izdelkov, n.sol.o, Ljubljana, Yugoslavia

Filed Apr. 3, 1979, Ser. No. 842,821
Claims priority, application Yugoslavia, Oct. 18, 1976, 2547/76; Oct. 18, 1976, 2549/76
Int. Cl.[2] C07C *49/76*
U.S. Cl. 260—591 1 Claim

1. The compound 1-(3-benzoylphenyl)-propine.

---

4,147,730

## SELECTIVE HYDROFORMYLATION PROCESS

Richard F. Love, Fishkill; Edwin R. Kerr, Wappingers Falls, both of N.Y., and John F. Knifton, Austin, Tex., assignors to Texaco Inc., New York, N.Y.

Filed Jun. 28, 1977, Ser. No. 810,710
Int. Cl.[2] C07C *45/08*
U.S. Cl. 260—604 HF 11 Claims

1. A process for preparing predominantly linear, straight-chain aldehydes containing from 3 to 31 carbon atoms by the catalytic hydroformylation of alpha-olefins containing from 2 to 30 carbon atoms with carbon monoxide and hydrogen by the steps of:

A. Admixing each mole of alpha-olefin to be hydroformylated, in a deoxygenated reaction medium, with at least a catalytic quantity of a supported hydroformylation catalyst consisting of at least one platinum halide, combined with at least one Group IVA metal halide bonded to a nitrogen-containing organic or inorganic support selected from the group consisting of:

(a) Polyvinyl homopolymers derived from 4-vinylpyridine and 2-vinylpyridine,

(b) Vinylpyridine polymers cross-linked with divinylbenzene,

(c) Vinylpyridine-styrene-divinylbenzene terpolymers,

(d) Styrene based polymers having appended to them tertiary amine groups, and

(e) Silica supports having organic nitrogen groups appended to said silica, to form a reaction mixture,

B. Pressurizing said reaction mixture with at least a sufficient carbon monoxide and hydrogen to satisfy the stoichiometry of the hydroformylation reaction;

C. Heating said pressurized reaction mixture to temperatures of from 20° to 130° C. until substantial formation of the aldehyde product is formed, and

D. Isolating said aldehyde products contained therein.

9. A catalytic hydroformylation process for preparing predominantly linear, straight-chain aldehydes containing from 3 to 31 carbon atoms by the catalytic hydroformylation of alpha-olefins containing from 2 to 30 carbon atoms with carbon monoxide and hydrogen by the steps of:

A. Mixing each mole of alpha-olefin tobe hydroformylated in a deoxygenated reaction medium, with at least a catalytic quantity of a recyclable catalyst consisting essentially of platinum chloride-tin chloride bonded to a 3-(2-aminoethyl) aminopropyl-trimethoxy silane silylized silica, to form a reaction mixture,

B. Pressurizing said reaction mixture with a least sufficient carbon monoxide and hydrogen to satisfy the stoichiometry of the hydroformyation reaction;

C. Heating said pressurized reaction mixture to temperatures of from 20° to 130° C. until substantial formation of the aldehyde product is formed;

D. Isolating said aldehyde products contained therein, adding additional alpha-olefin and forming another reaction mixture.

4,147,731

## PROCESS FOR NITROFORM ISOLATION

Milton B. Frankel, Tarzana; Frederick D. Raniere, Northridge; Wallace W. Thompson, Tarzana; Edward F. Witucki, Van Nuys, and Dean O. Woolery, II, Reseda, all of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Jan. 24, 1978, Ser. No. 871,904
Int. Cl.[2] C07C *76/02*
U.S. Cl. 260—644 5 Claims

1. A method of isolating nitroform, comprising the steps of:
adding sulfuric acid to the nitration mixture of nitric acid/nitroform/water,
preferentially extracting the nitroform from the acid solution using an organic solvent, and
extracting the nitroform from the organic solvent solution in water.

---

4,147,732

## PROCESS FOR PRODUCING PENTACHLORO-NITROBENZENE

Sudhir K. Mendiratta, Cleveland, Tenn., assignor to Olin Corporation, New Haven, Conn.

Filed Feb. 27, 1978, Ser. No. 881,272
Int. Cl.[2] C07C *79/12*
U.S. Cl. 260—646 12 Claims

1. A process for producing pentachloronitrobenzene comprising:
(a) mixing together sulfuric acid and pentachlorobenzene;
(b) mixing the resulting mixture with concentrated nitric acid at a temperature of from about 100° to about 120° C., said nitric acid being in molar excess of said pentachlorobenzene and the weight ratio of said sulfuric acid to said nitric acid being at least about 3:1;
(c) heating the resulting reaction mixture to a temperature in the range of about 130° C. to about 140° C. and maintaining said reaction mixture within said temperature range for a period of time which is no longer than is necessary for the conversion of pentachlorobenzene to pentachloronitrobenzene to be substantially complete;
(d) heating said reaction mixture to a temperature in the range of about 142° C. to about 160° C. to form a melt of pentachloronitrobenzene; and
(e) cooling said reaction mixture to recrystallize the melted pentachloronitrobenzene.

---

4,147,733

## FLUORINATION OF CHLORINATED HYDROCARBONS

Tom R. Fiske, and Daniel W. Baugh, Jr., both of Baton Rouge, La., assignors to The Dow Chemical Company, Midland, Mich.

Filed May 22, 1978, Ser. No. 908,310
Int. Cl.[2] C07C *17/08, 17/15*
U.S. Cl. 260—653.4 9 Claims

1. A process for making a fluorinated lower aliphatic hydrocarbon which comprises contacting a corresponding lower aliphatic chlorinated hydrocarbon in the vapor phase with HF in the presence of steam at about 275° C.–425° C. in the presence of a metal fluoride catalyst.

---

4,147,734

## PROCESS FOR DEALKYLATING AN ALKYLAROMATIC HYDROCARBON USING SUPPORTED CATALYST

Tansukhlal G. Dorawala; Edwin R. Kerr, both of Wappingers Falls; Robert G. Kochis, and Leon F. Koniz, both of Poughkeepsie, all of N.Y., assignors to Texaco Inc., New York, N.Y.

Division of Ser. No. 665,834, Mar. 11, 1976, abandoned. This application Apr. 1, 1977, Ser. No. 783,595
Int. Cl.[2] C07C *3/58*
U.S. Cl. 260—672 R 12 Claims

1. The process for dealkylating an alkyl aromatic hydrocarbon which comprises
passing a mixture of steam and an alkylaromatic hydrocarbon, at steam dealkylating conditions, into contact with a hydrogen activated supported catalyst containing 0.5–40 parts of $(VIII)_{2/n}O$, 0–40 parts of $(VI)_{2/m}O$, 0–5 parts of $(I)_2O$, and 15–99.5 parts of alumina support wherein VIII is a metal, of valence n, of Group VIII of the Periodic Table, VI is a metal of Group VI B of the Period Table of valence m, I represents a metal of Group I A of the Periodic Table, and said alumina support includes a catalytic amount of sulfate anion, said alumina support having been prepared from a charge substantially sulfate-free high-purity alumina by the process which comprises
adding to said charge high purity alumina a catalytic amount of a sulfate anion;
maintaining said charge alumina in contact with said catalytic amount of sulfate ion whereby said sulfate ion is distributed over the outside of said charge alumina and throughout substantially the entire body of said alumina thereby forming desired product treated alumina containing a catalytic amount of sulfate anion; and
recovering said desired product treated alumina containing a catalytic amount of sulfate anion.

---

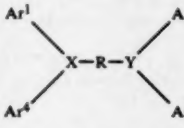
4,147,735

## SEPARATION OF ORGANIC COMPOUNDS FROM MIXTURES BY CLATHRATION

Douglas H. Brown; Ronald J. Cross, and David D. MacNicol, all of Glasgow, Scotland, assignors to National Research Development Corporation, London, England

Filed Mar. 31, 1978, Ser. No. 892,077
Claims priority, application United Kingdom, Apr. 13, 1977, 15242/77; Aug. 5, 1977, 32963/77; Sep. 6, 1977, 37169/77
Int. Cl.[2] C07C *7/00*
U.S. Cl. 260—674 WC 14 Claims

1. In the method of separating organic compounds by clathration, the improvement which comprises using as a host a compound of the formula:




[I]

where
in each of $Ar^1$, and $Ar^2$, $Ar^3$ and $Ar^4$ is identical to or different from the others and is an aromatic group;
each of X and Y is identical to or different from the other and is P, As or Sb, or P, As or Sb to which O, S or Se is bound;
R is a bond joining X and Y, or substituted or unsubstituted alkylene, substituted or unsubstituted arylene, substituted or unsubstituted alkenylene or substituted or unsubstituted alkynylene.

---

4,147,736

## METHOD OF PREPARING ISOPRENE AND ISOAMYLENES

Pavel Y. Gokhberg, prospekt Stoletova, 50, kv. 127, Volgograd; Boris N. Gorbunov, ulitsa Stepana Razina, 11/13, kv. 9, Tambov; Alexandr P. Khardin, ulitsa Krasnopiterskaya, 2, kv. 32, Volgograd; Vladimir L. Rudkovsky, prospekt Lenina, 33, kv. 6; Valentin M. Belyaev, prospekt Lenina, 32, kv. 20, both of Volzhsky Volgogradskoi oblasti; Anatoly I. Lukashov, ulitsa Palekhskaya, 9, korpus 1, kv. 65, Moscow; Ljudmila V. Shpantseva, ulitsa Karbysheva, 54, and Vitaly V. Orlyansky, ulitsa Sovetskaya, 5, kv. 21, both of Volzhsky Volgogradskoi oblasti, all of U.S.S.R.

Filed May 12, 1977, Ser. No. 796,067
Int. Cl.[2] C07C *1/20*
U.S. Cl. 260—681 5 Claims

1. A method for preparing isoprene and isoamylenes, com-

prising contacting a metal oxide catalyst selected from the group consisting of:

(i) aluminum oxide modified with an oxide of at least one of the elements selected from the group consisting of molybdenum, tungsten, chromium, titanium, vanadium, and cobalt, or

(ii) aluminum oxide modified with chromium sulfate, or

(iii) tantalum pentoxide,

with a gaseous mixture of isobutylene and methyl alcohol, having a molar ratio of 1:1 to 20:1, respectively, at a temperature of 250° to 500° C., in the absence of oxygen.

---

**4,147,737**

## POWDER COATING COMPOSITION EMPLOYING MIXTURE OF POLYEPOXIDE RESIN WITH MODIFIED POLYESTER RESIN

**Anton J. Sein; Johan Reitberg, both of Zwolle, and Johan M. Schouten, Dalfsen, all of Netherlands, assignors to Internationale Octrooi Maatschappij Octropa B.V., Rotterdam, Netherlands**

**Continuation of Ser. No. 624,693, Oct. 22, 1975, abandoned, which is a continuation of Ser. No. 316,943, Dec. 20, 1972, abandoned, which is a continuation-in-part of Ser. No. 211,648, Dec. 23, 1971, abandoned. This application Mar. 30, 1977, Ser. No. 782,685**

**Claims priority, application United Kingdom, Dec. 23, 1970, 61107/70**

**Int. Cl.² C08L *63/00***

**U.S. Cl. 260—835** **28 Claims**

1. A homogeneous pulverulent substantially unreacted thermosettable composition comprising a mixture of:

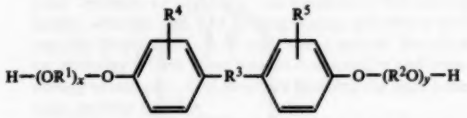
(1) 4% to 25% by weight of a polyepoxide compound or mixture of compounds, the molecules of which contain an average of at least two epoxy groups, and

(2) 75.% to 96% by weight of a solid modified polyester resin having an acid number of from 30 to 100, and which softens in the range 60° C. to 130° C., said solid modified polyester resin comprising the reaction product of:

(a) an anhydride of a polybasic, organic carboxylic acid, and

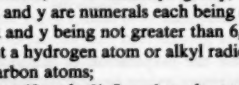
(b) a polyester resin having a hydroxyl number of from 15 to 50, the acid component of this polyester resin comprising a dibasic, aromatic carboxylic acid and the alcohol component comprising:

(c) from 0 to 100 mole % (based on the total alcohol component of the polyester) of an alcohol having the general formula:



in which $R^1$ and $R^2$ represent alkylene groups having from 2 to 4 carbon atoms, $R^3$ represents a direct bond between the rings or an alkylidene group having from 1 to 4 carbon atoms or a cycloalkylidene group having 6 carbon atoms, or a carbonyl group, or a sulphone group, x and y are numerals each being at least one, the sum of x and y being not greater than 6, and $R^4$ and $R^5$ represent a hydrogen atom or alkyl radical having from 1 to 6 carbon atoms;

(d) from 0 to 40 mole % (based on the total alcohol component of the polyester) of a glycidyl ester of the general formula:



in which R is a straight or branched chain, saturated or unsaturated hydrocarbon radical having from 4 to 20 carbon atoms, or a substituted or unsubstituted benzene nucleus, and

(e) from 0 to 100 mole % (based on the total alcohol component of the polyester) of at least one dihydric, aliphatic alcohol,

the sum of the alcohol components (c), (d), and (e) being 100 mole %, and said composition having a good powder stability.

---

**4,147,738**

## PROCESS FOR THE SOLID STATE POLYMERIZATION OF BRANCHED POLY(ALKYLENE TEREPHTHALATES) USING AROMATIC POLYCARBONATES

**Willem F. H. Borman, Evansville, Ind., assignor to General Electric Company, Pittsfield, Mass.**

**Filed Jan. 4, 1977, Ser. No. 756,644**

**Int. Cl.² C08L *67/02, 69/00***

**U.S. Cl. 260—860** **15 Claims**

1. An improved process for the preparation of a high melt viscosity hydroxy terminated branched copolyester comprising alkylene terephthalate units and from 0.01 to 3 mole percent, based on the terephthalate units, of units of a branching component which contains at least three ester-forming groups, said branched polyester having a melt viscosity of greater than about 10,000 poises, said process comprising:

(a) forming an intimate blend of a corresponding, normally solid branched copolyester having a melt viscosity of below 3,000 poises and from 0.1 to 5.0 percent by weight of an aromatic (poly-) or (copoly-)carbonate resin and transforming said blend into a solid particulate state; and

(b) heating the particles of solid branched copolyester-aromatic (poly-) or (copoly-)carbonate blend at a temperature of at least 150° C. and below the melting point of said polyester in the presence of an inert gas until the desired degree of increase in melt viscosity is obtained.

---

**4,147,739**

## THERMOPLASTIC MOLDING COMPOSITIONS OF RUBBER MODIFIED COPOLYMERS OF A VINYL AROMATIC COMPOUND AND AN α,β-UNSATURATED CYCLIC ANHYDRIDE

**Gim F. Lee, Jr., Albany, N.Y., assignor to General Electric Company, Pittsfield, Mass.**

**Division of Ser. No. 671,569, Mar. 29, 1976, Pat. No. 4,113,797. This application May 26, 1978, Ser. No. 909,954**

**Int. Cl.² C08L *51/04***

**U.S. Cl. 260—876 R** **14 Claims**

1. A thermoplastic molding composition which coprises an intimate admixture of:

(i) from about 5 to about 95 parts by weight of a rubber-modified copolymer of a vinyl aromatic compound and an α,β-unsaturated cyclic anhydride;

(ii) from about 30 to about 1 parts by weight of a graft copolymer of a vinyl aromatic compound and a conjugated diene, and

(iii) from 0 to about 95 parts by weight of a polyphenylene ether resin.

---

**4,147,740**

## GRAFT MODIFIED POLYETHYLENE PROCESS AND PRODUCT

**Roger T. Swiger, Schenectady, and Peter C. Juliano, Scotia, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.**

**Filed Sep. 15, 1976, Ser. No. 723,618**

**Int. Cl.² C08F *255/02***

**U.S. Cl. 260—878 R** **16 Claims**

1. A process which comprises, mixing polyethylene with from 0.1 to 1.5% by weight, based on the weight of unmodified polyethylene, of an ethylenically unsaturated polycarboxylic acid anhydride modifier, under melt conditions at a temperature within the range of from 140° C. to 210° C. in the presence

of an organic peroxide having a half life of at least about 60 seconds within said temperature range whereby substantially all of said modifier is grafted onto the polyethylene backbone to produce a graft modified polyethylene, said graft modified polyethylene having a melt viscosity greater than the melt viscosity of said unmodified polyethylene.

---

4,147,741

## ANTI-DRIP ADDITIVE SYSTEM FOR FIRE RETARDANT POLYPROPYLENE

**Francis J. Slama, Aurora, and Ivor R. Fielding, Naperville, both of Ill., assignors to Standard Oil Company (Indiana), Chicago, Ill.**

**Division of Ser. No. 652,879, Jan. 27, 1976, Pat. No. 4,059,650. This application Feb. 25, 1977, Ser. No. 772,110**

**Int. Cl.[2] C08L *23/00***

**U.S. Cl. 260—878 R** **8 Claims**

1. A composition comprising:

(a) a resinous polymer of propylene comprising an alpha, beta-ethylenically unsaturated carboxylic acid modified resinous polymer of propylene; and

(b) a polyfunctional aliphatic polyamine cross-linker containing at least two primary amino groups in a concentration of 0.5 to 15 parts by weight cross-linker per 100 parts by weight resinous polymer of propylene, wherein cross-linking occurs when said composition is exposed to fire.

---

4,147,742

## SOLID ANTISTATIC COMPOSITIONS

**Anthony J. Castro, Oak Park, and James W. Stoll, Woodridge, both of Ill., assignors to Akzona Incorporated, Asheville, N.C.**

**Continuation-in-part of Ser. No. 436,252, Jan. 24, 1974, abandoned. This application Oct. 15, 1975, Ser. No. 622,643**

**Int. Cl.[2] C08L *23/12, 110/06***

**U.S. Cl. 260—897 R** **13 Claims**

12. A method of rendering antistatic a polymer subject to the development of electrostatic charges which comprises adding to said polymer in an amount effective to render said polymer antistatic an antistatic agent consisting of a normally liquid N,N-bis-(2-hydroxyethyl) aliphatic ($C_6$–$C_{18}$) amine having antistatic properties and a resin carrier selected from the group consisting of polypropylene, polyethylene, polystyrene, a copolymer of styrene and butadiene, a copolymer of styrene and acrylonitrile, a copolymer of ethylene and acrylic acid, and mixtures thereof, said amine being present in an amount of from about 10% to about 90%, based upon the total weight of the amine and the resin carrier and said antistatic agent being a solid with no visually discernible liquid phase.

---

4,147,743

## AMPHOLYTIC, FLUORINE-CONTAINING ESTERS OF PHOSPHOROUS ACID

**Heinrich Bathelt, Altötting; Siegfried Billenstein, Burgkirchen, Alz, and Erich Schuierer, Burghausen, Salzach, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**

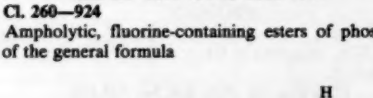
**Filed Dec. 9, 1977, Ser. No. 859,051**

**Claims priority, application Fed. Rep. of Germany, Dec. 13, 1976, 2656424**

**Int. Cl.[2] C07F *9/141*; C11D *9/36***

**U.S. Cl. 260—924** **1 Claim**

1. Ampholytic, fluorine-containing esters of phosphorous acid of the general formula



(I)

in which $R_f$ represents a perfluoroalkyl radical having 3 to 16 C atoms, $R_1$ and $R_2$ which can be identical or different represent hydrogen atoms, short-chain alkyl radicals having 1 to 4 C atoms, cyclohexyl radicals, 2-hydroxyalkyl radicals or the radical $R_f$—$(CF{=}CH)_m$—$(CH_2)_p$— and Q represents alkylene radicals —$(CH_2)_x$— with x = 2 or 3 and alkylene radicals —$CH_2CHR$— or —$CH_2CRR'$—$CH_2$ with R and R′ being a short-chain alkyl radical or a phenyl radical, it also being possible for R′ to be H, and in which, furthermore, m is 0 or 1 and p is an integer from 1 to 4.

---

4,147,744

## TRANSPARENT YTTRIA CERAMICS AND METHOD FOR PRODUCING SAME

**William H. Rhodes, Lexington, Mass., assignor to GTE Laboratories Incorporated, Waltham, Mass.**

**Division of Ser. No. 814,341, Jul. 11, 1977, Pat. No. 4,115,134. This application Mar. 31, 1978, Ser. No. 892,227**

**Int. Cl.[2] C04B *35/50***

**U.S. Cl. 264—1** **9 Claims**

1. A process for preparing a substantially transparent, high density polycrystalline yttria-based body comprising admixing lanthana or a precursor thereof convertible by calcining to lanthana-yttria solid solution with yttria or a precursor thereof convertible by calcining to yttria-lanthana solid solution, drying the resulting powder, calcining the dried powder at 1000° C. in air, pressing the calcined powder into a given shape, and sintering the shaped powder for about 1/6 to 6 hours at a temperature above the H-phase transition and ½ to 6 hours at a temperature below the H- to C-phase transition in an atmosphere sufficiently low in oxygen to prevent oxidative contamination.

---

4,147,745

## PROCESS FOR PRODUCING SEMIPERMEABLE MEMBRANES

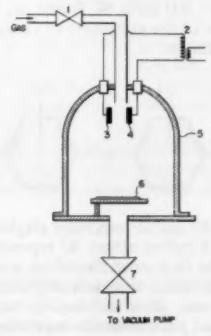
**Takezo Sano, Takatsuki; Takatoshi Shimomura, Toyonaka; Masao Sasaki, Osaka, and Ichiki Murase, Ibaragi, all of Japan, assignors to Sumitomo Chemical Company Limited, Osaka, Japan**

**Filed Aug. 13, 1976, Ser. No. 714,239**

**Claims priority, application Japan, Aug. 25, 1975, 50-103329**

**Int. Cl.[2] B29H *7/20***

**U.S. Cl. 264—22** **9 Claims**



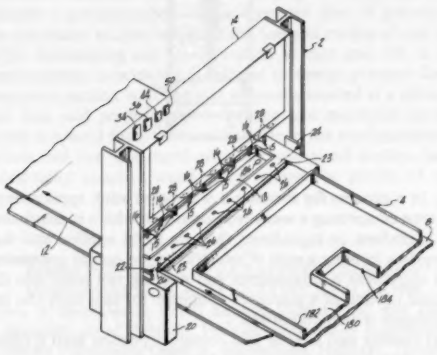

1. A method for the preparation of semipermeable membrane which comprises exposing porous shaped articles of polyacrylonitrile or copolymers containing acrylonitrile in an amount of more than 40% by mole to a plasma, wherein said porous shaped articles of said polymeric material are prepared by a method comprising the steps of (a) dissolving the polymeric material in a solvent, (b) casting the resulting solution, (c) dipping the cast solution in a non-solvent to prepare a porous membrane after partial evaporation of the solvent of the solution or without evaporation thereof, and (d) drying the wet porous membrane thus obtained.

4,147,746

## GENERATION OF POLYURETHANE FOAM

Gerald V. Dever, Jr., Trumbull, and Louis R. Chiocchio, East Haven, both of Conn., assignors to Olin Corporation, New Haven, Conn.

Division of Ser. No. 806,045, Jun. 13, 1977, Pat. No. 4,125,138, which is a division of Ser. No. 762,555, Jan. 25, 1977. This application Feb. 21, 1978, Ser. No. 879,284
Int. Cl.[2] B29D *27/04*
U.S. Cl. 264—39 5 Claims



1. A method of generating foam from a mixture of foam-forming materials in a structure having a preformed configuration, said foam-forming materials being dispensed from a plurality of stationary foam gun heads having valve means therein for controlling the discharge of the foam-forming materials therefrom, said method comprising:

(a) conveying said structure along a horizontal path underneath said stationary foam gun heads with said foam gun heads having outlets being spaced transversely across said path;

(b) horizontally sensing the presence of said structure at a point upstream of said foam gun heads by a first sensing means, wherein said first sensing means includes a horizontally directed photocell and means spaced therefrom for directing a light beam thereto horizontally and transversely to said path, said structure breaking the light beam when passing thereby;

(c) vertically sensing along a vertical line through a point upstream of each of said gun head outlets the presence of at least a portion of said structure by a plurality of second sensing means spaced from each other in a direction transverse to said horizontal path, each one of said second sensing means being associated with one foam gun head;

(d) opening the valve means of at least one of said foam gun heads in response to said first sensing means sensing the presence of the structure and the second sensing means being associated with said at least one of said foam gun heads and sensing the presence of said structure;

(e) closing the valve means of said at least one of said foam gun heads in response to its associated second sensing means sensing the absence of said structure; and

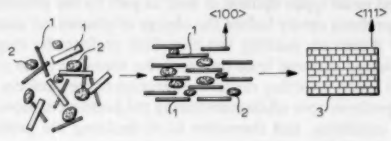
(f) reopening said closed valve means when said horizontal photocell and said associated second sensing means again sense the presence of said structure, thereby automatically compensating for narrow width or openings of said structure.

4,147,747

## METHOD OF MAKING A POLYCRYSTALLINE MN CONTAINING FERRITE BODY

Keizo Iwase, Shiga; Toshio Takada, Kyoto, and Yoshichika Bando, Takatsuki, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Continuation of Ser. No. 421,925, Dec. 5, 1973, abandoned. This application Oct. 6, 1976, Ser. No. 729,972
Claims priority, application Japan, Dec. 11, 1972, 47-124103
Int. Cl.[2] C04B *35/36*
U.S. Cl. 264—65 21 Claims




1. A method of making a polycrystalline Mn containing ferrite body, comprising the steps of: providing a manganese compound, the particles of which are thin platelets which have substantially parallel major surfaces; shaping into a body a mixture comprising at least 5% by weight of said manganese compound and more than 50% by weight of spinel ferrite constituents selected from the group consisting of Fe, Co, Zn, Ni, Mg, Li and Cu with said parallel major surfaces being oriented substantially in one direction in said body of said mixture; and sintering said body of said mixture at a temperature of from 1000° to 1450° C. thereby converting said body into a polycrystalline Mn containing ferrite body of a spinel structure consisting essentially of crystallites which have the (111)-crystallographic planes thereof substantially oriented parallel with each other.

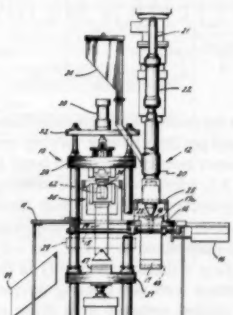
---

4,147,748

## DISPLACEMENT BLOW-MOLDING

Robert W. Saumsiegle, 27 Priscilla Rd., Wellesley, Mass. 02181

Filed Jul. 23, 1976, Ser. No. 708,145
Int. Cl.[2] B29C *17/07*
U.S. Cl. 264—523 4 Claims



1. A method for forming a hollow article from plasticized material comprising depositing a charge of plasticized material into a preform cavity by locating an orifice for delivery of the plasticized material near the bottom of the preform cavity, commencing the delivery of plasticized material from the delivery orifice while the orifice is near the bottom of the preform cavity, delivering plasticized material from the orifice as relative separation between the orifice and the bottom of the

cavity is effected to deposit a substantially void-free, substantially symmetrical charge in the preform cavity and in receiving means in communication with the preform cavity, effecting relative withdrawal of the delivery orifice from the preform cavity, predetermining and establishing a desired distance relationship between the delivery orifice and the level of the charge of plasticized material during delivery thereof to the preform cavity, effecting relative telescopic movement of the preform cavity and a preform core to displace the charge of plasticized material in the preform cavity, thereby forming an unpacked preform on the preform core, forming a substantially closed mold space defined at least in part by the preform core and preform cavity before the charge of plasticized material is fully displaced, packing the unpacked preform by displacing plasticized material from the receiving means into the preform mold space, effecting relative separation of the preform cavity and preform core while maintaining the preform in blow-moldable condition, and thereafter blow molding the preform to form the hollow article.

---

**4,147,749**

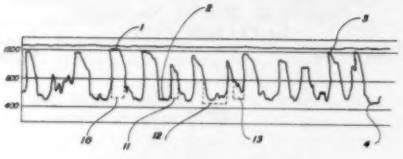
## VARIED ORIENTATION OF FIBERS

**Walter P. Lipscomb, Chester; John R. McKlveen, Colonial Heights, and Garland L. Turner, Chesterfield, all of Va., assignors to Allied Chemical Corporation, Morris Township, Morris County, N.J.**

**Continuation of Ser. No. 604,754, Aug. 14, 1975, abandoned, which is a continuation of Ser. No. 322,654, Jan. 11, 1973, abandoned, which is a division of Ser. No. 87,030, Nov. 5, 1970, abandoned. This application Sep. 22, 1976, Ser. No. 725,617**

**Int. Cl.[2] D01D *5/20***

**U.S. Cl. 264—167** **1 Claim**



1. A process for producing thick-thin filaments composed of randomly spaced portions having varying cross-sectional areas wherein the denier ratio between said large and small portions is about 2.1 to 2.3, which comprises extruding a filament-forming synthetic polycaproamide polymer through an orifice to form a continuous filament, contacting said filament with a cooling device maintained at $-4°$ C. to $-8°$ C. for about 0.5 second to produce a thermal instability in the segment of said filament in contact with said cooling device and immediately drawing said cooled segment at a draw ratio of about 2.5 whereby randomly spaced portions of large and small diameter are produced, said process being further characterized in that the thermal instability and drawing conditions are controlled within the following limits:

(a) $E_D - E_Y = 1.5 \times 10^{-3}$ to $4.5 \times 10^{-3}$ cal/m/den;

(b) $t_c$ = about 0.05 second; and

(c) $d_E/d_t = 5 \times 10^2$ to $12 \times 10^3$ cal/gm/sec.

where:

$E_D$ = Internal energy required to draw entire length of filament

$E_Y$ = Internal energy of chilled filament

$t_c$ = Contact time between filament and chiller

$d_E/d_t$ = Rate of heat removal from said filament.

**4,147,750**

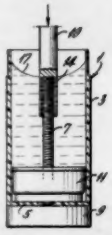
## METHOD FOR ELIMINATING SHRINKAGE CAVITIES IN CAST COSMETIC STICKS AND SIMILAR PRODUCTS

**Navin Geria, Elizabeth, N.J., and George Shaleesh, Staten Island, N.Y., assignors to Bristol-Myers Company, New York, N.Y.**

**Filed Jul. 24, 1978, Ser. No. 927,438**

**Int. Cl.[2] B29C *5/00*; B29F *5/00***

**U.S. Cl. 264—255** **6 Claims**



1. In a process for forming a wax-based stick applicator of the type comprising a waxy type carrier in which is distributed the ingredient or ingredients that are to be applied and that comprises forming a melt of said waxy type carrier containing said ingredient or ingredients and pouring salt melt into the opened portion of a dispenser container for said stick the improvement which comprises:

(a) cooling said melt in said container portion until it forms a mass having a semi-solid consistency;

(b) inserting a hollow tubular probe into said mass at about the center of the surface thereof and for a distance sufficient to encounter any voids that may have developed in said mass;

(c) withdrawing said probe from said semi-solid mass whereby a cavity is formed in said mass extending downwardly from the surface thereof; and

(d) heating said semi-solid mass to a temperature that is sufficiently high so that said material in said container portion melts, flows into and fills up the cavity formed in step (c) above.

---

**4,147,751**

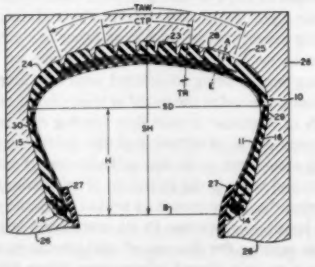
## METHOD OF MAKING A PNEUMATIC TIRE

**John F. Duderstadt, Cuyahoga Falls; Henry L. Gresens, Akron, and Michael A. Kolowski, Tallmadge, all of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Division of Ser. No. 490,803, Jul. 22, 1974, abandoned. This application Aug. 22, 1977, Ser. No. 826,816**

**Int. Cl.[2] B29H *5/02***

**U.S. Cl. 264—326** **3 Claims**



1. In a method of making a pneumatic tire of the type having a radial ply carcass including sidewall portions and bead portions, a tread portion having a substantially constant tread radius across the tread profile when inflated to design inflation

pressure and a circumferentially extending cord reinforced open end belt with an outer belt ply and an inner belt ply of high modulus material extending around said radial ply carcass, said belt having cords with a cord angle between 17 and 26 degrees with respect to the mid-circumferential centerline of the tread portion, the improvement comprising: placing the tire in a mold, forming the tire in a toroidal configuration, forming a curved tread surface with a constant positive tread radius at the center of the tread portion which is less than said tread radius of the tire when inflated, forming said tread surface at the lateral edges of the tread portion with a positive tread radius which is greater than said tread radius of the tire when inflated, forming sidewall portions in the mold with the maximum sectional width of the tire spaced from the bead baseline a predetermined distance greater than 55 percent of the maximum section height of the tire and curing of said tire while maintaining said configuration so that said tire in the configuration in which it is inflated to design pressure has a maximum section width of said sidewalls located at a distance less than said predetermined distance said maximum section width is spaced from the bead baseline in the configuration in which said tire was cured whereby said tread portion has a subtantially constant tread radius across the profile of said tread.

---

## 4,147,752

## FORM PIECE FOR APPARATUSES USED FOR IMMUNOASSAYS AND ENZYME REACTIONS

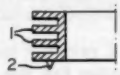
**Osmo A. Suovaniemi; Pertti Ekholm; Jukka Suni, and Johan Järnefelt, all of Helsinki, Finland, assignors to Kommandiittihytio Finnpipette Osmo A. Souvaniemi, Helsinki, Finland**

**Filed Jan. 11, 1978, Ser. No. 868,491**

**Claims priority, application Finland, Jan. 14, 1977, 770116**

**Int. Cl.[2] G01N *33/16***

**U.S. Cl. 422—57** **8 Claims**




1. A form piece mountable within a laboratory test vessel and adapted to be coated with and hold on at least a portion of its surface a material useful in laboratory tests includes:

a ring-like body member having an aperture extending there through and an outer surface; and

at least one projecting member extending outwardly from the outer surface area of said body member to space the body member from the vessel.

---

## 4,147,753

## APPARATUS FOR THE THERMAL CRACKING OF HEAVY HYDROCARBON

**Tomizo Endo; Yutaka Sumida; Toru Kawahara; Masaichi Ohtake; Shoichi Motokawa; Keiji Nagayama; Masatomo Shigeta; Hiroshi Hozuma; Masaharu Tomizawa, and Hideo Kikuchi, all of Iwaki, Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha and Chiyoda Chemical Engineering & Construction Co., Ltd., both of, Japan**

**Division of Ser. No. 732,301, Oct. 14, 1976, Pat. No. 4,085,034. This application Nov. 11, 1977, Ser. No. 850,543**

**Claims priority, application Japan, Oct. 14, 1975, 50-122855; Oct. 14, 1975, 50-122857**

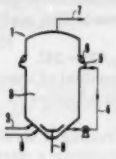
**Int. Cl.[2] C10G *9/16, 9/18;* B01J *4/00***

**U.S. Cl. 422—202** **4 Claims**

1. An apparatus for the thermal cracking of a heavy hydrocarbon in a reactor by direct contact with a heating medium, said apparatus comprising:

(a) a vertical, generally cylindrical closed vessel having a radially outwardly extending interior annular recess around an upper portion of its inner cylindrical surface, said annular recess forming a part of the inner wall of said vessel;

(b) means for removing a liquid portion of a reaction mass from the lower interior of said vessel; and



(c) plural means for injecting said liquid portion into said annular recess in a direction tangential to said inner cylindrical surface to form a liquid curtain over the portion of the inner cylindrical wall below said annular recess.

---

## 4,147,754

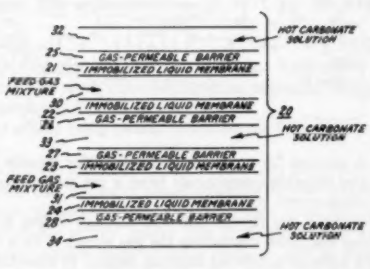
## SYSTEM FOR SELECTIVE REMOVAL OF HYDROGEN SULFIDE FROM A MIXTURE OF GASES

**William J. Ward, III, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.**

**Division of Ser. No. 599,872, Jul. 28, 1975, abandoned. This application Jul. 20, 1977, Ser. No. 817,327**

**Int. Cl.[2] B01D *53/34***

**U.S. Cl. 423—224** **3 Claims**




1. A method of selectively removing hydrogen sulfide from a mixture of gases including carbon dioxide, comprising:

contacting an immobilized liquid membrane with said mixture to allow facilitated transport of hydrogen sulfide through said membrane to a porous gas-permeable barrier;

passing gases emerging from said membrane through said gas-permeable barrier;

absorbing in a sweep liquid the gases emerging from said gas-permeable barrier; and

said sweep liquid comprising a liquid selected from a group consisting of a hot carbonate solution, a solution of redox agent which converts hydrogen sulfide to sulfur, and an ethanol amine solution.

4,147,755

## AIR POLLUTION CONTROL PROCESS

Madanamohana R. Gogineni, Enfield; Philip C. Rader, Windsor Locks, and Wilfred R. Roczniak, Enfield, all of Conn., assignors to Combustion Engineering, Inc., Windsor, Conn.

Continuation-in-part of Ser. No. 504,612, Sep. 9, 1974, abandoned. This application Apr. 21, 1977, Ser. No. 789,590
Int. Cl.[2] C01B *17/00*
U.S. Cl. 423—242 3 Claims

1. A method of removing $SO_2$ from the flue gases produced in the combustion of sulfur-containing fuels comprising the steps of:

a. providing a scrubbing medium, said scrubbing medium comprising a mixture of water and the $Ca(OH)_2$ sludge from an acetylene manufacturing process, said $Ca(OH)_2$ sludge containing at least one ingredient which inhibits the oxidation of sulfite to sulfate,

b. contacting said flue gas in a scrubbing zone with said scrubbing medium whereby said $SO_2$ reacts with said scrubbing medium to form sulfite,

c. withdrawing said scrubbing medium from said scrubbing zone,

d. separating precipitated calcium sulfite from said withdrawn scrubbing medium, and

e. recycling said scrubbing medium from step (d.) to step (a.) to form said scrubbing medium.

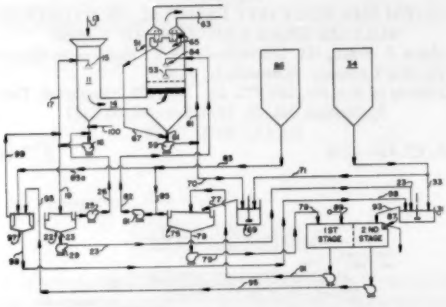
---

4,147,756

## COMBUSTION GAS SCRUBBING SYSTEM

Donald A. Dahlstrom, Salt Lake City, Utah; William Ellison, Lebanon, Pa., and James H. Wilhelm, Sandy, Utah, assignors to Envirotech Corporation, Menlo Park, Calif.

Filed Apr. 9, 1976, Ser. No. 675,364
Int. Cl.[2] C01B *17/00*
U.S. Cl. 423—242 23 Claims




12. A process for removing gaseous sulfur dioxide components and chloride components from a gas stream containing those components comprising:

a. passing a gas stream into and through a first scrubbing zone and there contacting the gas stream with a circulating aqueous scrubbing solution capable of absorbing chloride components from the gas stream;

b. treating a portion of the aqueous scrubbing solution which has contacted the gas stream with a neutralizing agent to raise the treated portion to above about pH 2.0;

c. passing the gas stream into and through a second scrubbing zone subsequent to said first scrubbing zone and there contacting the gas stream with a circulating sodium-base scrubbing solution capable of absorbing sulfur dioxide components from the gas stream;

d. treating a portion of the sodium-base scrubbing solution which has contacted the gas stream with an alkali compound to regenerate the active alkali components of the sodium-base scrubbing solution and to form solid precipitates in liquid suspension;

e. in a first filtration stage, filtering the solid precipitates from the liquid suspension to form a cake of solids and returning the filtrate to said second scrubbing zone; and

f. in a second filtration stage, washing the cake of solids with the treated aqueous scrubbing solution and returning the filtrate to said first scrubbing zone to commingle with the circulating aqueous scrubbing solution therein.

---

4,147,757

## METHOD FOR PRODUCING AMMONIUM PHOSPHATE WHICH IS SUBSTANTIALLY FREE OF ARSENIC

Thomas E. Richards, Houston, and Santad Kongpricha, Deer Park, both of Tex., assignors to Olin Corporation, New Haven, Conn.

Continuation-in-part of Ser. No. 749,856, Dec. 13, 1976, abandoned. This application Nov. 18, 1977, Ser. No. 852,649
Int. Cl.[2] C01B *15/16, 25/26, 25/16*
U.S. Cl. 423—313 25 Claims

1. A process for producing ammonium phosphate that is substantially free of arsenic which comprises:

(a) reacting crude phosphoric acid containing dissolved arsenic having a +5 valence state with ammonia and arsenic-reducing agent in sufficient proportions to form an ammonium phosphate solution and to reduce the arsenic from the +5 valence state to a lower valence state;

(b) forming ammonium phosphate crystals from said solution, leaving a mother liquor that contains substantially all of said arsenic; and

(c) recovering said ammonium phosphate crystals that are substantially free of arsenic impurities from said mother liquor.

---

4,147,758

## PRODUCTION OF ALUMINUM POLYPHOSPHATE

Renate Adrian; Raban von Schenck, both of Hurth; Bernd Cox, Elz, and Peter Wirtz, Konigstein, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed May 9, 1977, Ser. No. 794,959
Claims priority, application Fed. Rep. of Germany, May 13, 1976, 2621170
Int. Cl.[2] C01B *15/16, 25/26*
U.S. Cl. 423—315 5 Claims

1. A process of producing long chain aluminium polyphosphates as defined in ASTM 13-266, which comprises step (A) of introducing into a reaction zone as starting materials aluminum hydroxide and polyphosphoric acid containing 75 to 85 weight % of $P_2O_5$ in amounts corresponding to a molar ratio of Al:P of 1:2.5 to 1:3.5; continuously mixing, kneading and comminuting the starting materials in the reaction zone and heating the resulting mixture at a temperature of 150° to 200° C. for as long as necessary to ensure conversion to a dry, sandy, pulverulent intermediate product; and step (B) of dehydrating said intermediate product by annealing it at temperatures within the range 400° to 600° C. for a period sufficient to yield a final product undergoing 0.5 to 1% weight loss on ignition.

---

4,147,759

## METHOD OF MANUFACTURING β' SiAlON COMPOUNDS

Joel Demit, Tarbes, France, assignor to Ceraver, Paris, France

Filed Sep. 27, 1977, Ser. No. 837,247
Claims priority, application France, Sep. 27, 1976, 76 2008
Int. Cl.[2] C01B *21/00, 33/26*
U.S. Cl. 423—327 12 Claims

1. Method of manufacturing β' SiAlON compounds corresponding to the general formula $Si_{6-z}Al_zO_zN_{8-z}$, in which z represents a number less than or equal to 2,8, wherein silicon nitride in a finely divided state is made to react at a temperature greater than 1600° C. with aluminum oxynitride in a finely divided state, without load, in the presence of gaseous silicon monoxide.

4,147,760

## THICKENING AGENT FOR LIQUID MEDIA CONSISTING OF HIGHLY DISPERSED SILICON DIOXIDE AND PROCESS FOR MAKING THE SAME

Günter Kratel; Günter Stohr, both of Durach-Bechen; Ludwig Eberle, Lenzfried, and Ernst Mühlhofer, Durach, all of Fed. Rep. of Germany, assignors to Wacker-Chemie GmbH, Munich, Fed. Rep. of Germany

Filed Feb. 22, 1977, Ser. No. 770,338

Claims priority, application Fed. Rep. of Germany, Mar. 8, 1976, 26094871

Int. Cl.[2] C01B *33/12;* C09C *1/28*

U.S. Cl. 423—336 3 Claims

1. A process for the manufacture of highly dispersed silicon dioxide with improved thickening action by treatment of pyrogenically produced silicic acid comprising the following steps:

a. preparing silicic acid by flame hydrolysis from silicon halides,

b. separating the silicic acid from generated gases,

c. treating the acid with 2 to 10 percent by weight of silicon tetrachloride calculated on silicic acid, while optionally mechanically stirring,

d. hydrolysing the product by means of an air/water vapor mixture, and

e. finally deacifying to obtain the silicon dioxide of improved thickening action.

---

4,147,761

## HYPOCHLOROUS ACID PROCESS USING SWEEP REACTOR

John A. Wojtowicz, and Andrew J. Klanica, both of Cheshire, Conn., assignors to Olin Corporation, New Haven, Conn.

Filed Mar. 9, 1978, Ser. No. 884,950

Int. Cl.[2] C01B *11/04, 11/06*

U.S. Cl. 423—473 17 Claims

1. A process for preparing hypochlorous acid in a reactor which comprises rapidly passing gaseous chlorine in contact with the surface of an agitated solution of an alkali metal hydroxide at a temperature below about 50° C.,

a. whereby a gaseous phase containing unreacted chlorine, hypochlorous acid, and chlorine monoxide is formed,

b. whereby a reaction product of suspended particles of alkali metal chloride in an aqueous solution of alkali metal hypochlorite is formed, and

c. separating said gaseous phase as it forms.

---

4,147,762

## REDUCTION OF $SO_2$ WITH COAL

Peter Steiner, Edison, N.J., assignor to Foster Wheeler Energy Corporation, Livingston, N.J.

Continuation-in-part of Ser. No. 489,337, Jul. 17, 1974, abandoned, and a continuation-in-part of Ser. No. 279,410, Aug. 10, 1972, abandoned. This application Nov. 26, 1975, Ser. No. 635,497

Int. Cl.[2] C01B *17/04*

U.S. Cl. 423—569 8 Claims

1. A continuous process for the reduction of sulfur dioxide to sulfur comprising introducing steam and a sulfur dioxide-containing off-gas in a mole ratio of steam to $SO_2$ of from 2 to 3 into a reactor containing coal and maintained at a temperature which will convert the sulfur dioxide to sulfur, said temperature being from 1150° F. to 1550° F., contacting said sulfur dioxide-containing off-gas and said steam with said coal in said reactor and withdrawing sulfur from said reactor.

4,147,763

## SULFUR DIOXIDE REDUCTION PROCESS UTILIZING CATALYSTS WITH SPINEL STRUCTURE

Howard McKinzie, Framingham; Joseph E. Lester, Acton, and Frank C. Palilla, Framingham, all of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed Dec. 27, 1977, Ser. No. 864,693

Int. Cl.[2] C01B *17/04*

U.S. Cl. 423—570 6 Claims

1. A process for removing sulfur dioxide from a gas stream containing sulfur dioxide and a reducing gas selected from the group consisting of hydrogen and carbon monoxide comprising the steps of:

heating the gas stream to an elevated temperature,

passing the heated gas stream through a reaction chamber initially charged with material of composition of the general formula $M^{II}M_2^{III}O_4$ crystallized in the spinel structure, wherein $M^{II}$ is a divalent metal and $M^{III}$ is a trivalent metal from the first transition period of the Periodic Table of Elements, whereby said sulfur dioxide and said reducing gas react on the surface of said material to produce among the reaction products elemental sulfur, and

thereafter separating said elemental sulfur from the reaction product stream.

---

4,147,764

## HYDROPHILIC ABSORBENTS

Didya D. Levy, Brooklyn, N.Y., and Samuel H. Ronel, Princeton, N.J., assignors to National Patent Development Corporation, New York, N.Y.

Division of Ser. No. 551,016, Feb. 19, 1975, Pat. No. 4,081,402, which is a continuation-in-part of Ser. No. 384,230, Jul. 31, 1973, abandoned. This application Aug. 15, 1977, Ser. No. 824,703

Int. Cl.[2] G01N *33/16*

U.S. Cl. 424—1 11 Claims

1. An article of manufacture comprising a hydrophilic polymer matrix and particulate microporous activated carbon dispersed therein,

A. said article being characterized by the following properties:

(i) solid, (ii) insoluble in deionized water and lower alkanols, (iii) normally shape-retaining in the dehydrated state as well as in the fully hydrated state, (iv) water-swellable to the extent that it possesses a deionized water-uptake value of from 200% to 2200%, based on the weight of the dehydrated article, (v) a partition coefficient of at least 2, (vi) an average molecular weight diffusion limitation of about 10,000 Daltons, and (vii) a gross external surface area no greater than about one percent of the total surface area of total microporous activated carbon dispersed therein;

B. said polymer being a hydrophilic polymer of a hydroxy $C_1$-$C_3$ alkyl acrylate or methacrylate (i) having an average molecular weight greater than about 40,000, and (ii) a deionized water-uptake value in the range of from 60% to 4000%, based on the weight of said polymer; and

C. the concentration of said activated carbon being in the range of from 0.01 to 50 weight percent, based on the weight of said polymer, said article containing an antigen having a molecular weight below 10,000.

4,147,765

## PREPARATION OF ANTISERUM FOR QUANTITATIVE DETERMINATION OF X AND Y DEGRADATION PRODUCTS OF FIBRIN AND FIBRINOGEN

Wolfgang Stephan, Dreieichenhain, and Ronald Kotitschke, Frankfurt am Main, both of Fed. Rep. of Germany, assignors to Biotest-Serum-Institut GmbH, Frankfurt am Main, Fed. Rep. of Germany

Filed Jul. 16, 1976, Ser. No. 706,050

Claims priority, application Fed. Rep. of Germany, Jul. 18, 1975, 2532151

Int. Cl.[2] A23J *1/06;* G01N *31/02, 33/16*

U.S. Cl. 424—12 9 Claims

1. A method for the preparation of an antiserum against the degradation products X and Y of fibrin and fibrinogen which are obtained by the action of plasmin on fibrin or fibrinogen, comprising administering the purified degradation products to an experimental animal thereby to immunize said animal, drawing serum from said animal, and a plurality of times contacting said serum with a human plasma and separating the resultant precipitate, and repeating the contact and separation until there is left a supernatant liquid which constitutes said antiserum and is specific to X and Y.

---

4,147,766

## MACROSPHERICAL PARTICLES OF ANTI-PERSPIRANTS

James F. Kozischek, Belvidere, N.J., assignor to Armour Pharmaceutical Company, Phoenix, Ariz.

Filed Jun. 9, 1976, Ser. No. 694,419

Int. Cl.[2] F26B *3/08, 7/00, 19/00;* C07F *7/00, 5/06;* C01B *7/00;* A61J *3/07;* A61K *7/38*

U.S. Cl. 424—14 6 Claims

1. Hollow, thick-walled macrospherical particles, said walls consisting essentially of anti-perspirant material, at least about 85 percent of said particles having diameters greater than 15 microns and few of said particles having diameters greater than 74 microns, said particles having a true density greater than 1, the walls of said particles having sufficient thickness to withstand shipping, handling and dispensing without substantial fragmentation into smaller particles which may be respired and retained in the lungs.

---

4,147,767

## ALBUMIN MEDICAMENT CARRIER SYSTEM

Anthony F. Yapel, Jr., Saint Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Continuation-in-part of Ser. No. 621,145, Oct. 9, 1975, abandoned. This application Sep. 30, 1977, Ser. No. 838,355

Int. Cl.[2] A61K *9/50*

U.S. Cl. 424—22 18 Claims

1. A therapeutic composition for controlling the release of drugs comprising solid spherules of serum albumin having homogeneously entrapped therein from 5 to 30 percent by weight of the spherule of an organic medicament which is at least 0.01 percent water soluble at 37° C., which spherules have been crosslinked by a process selected from the group consisting of: (a) heating at 110° to 180° C. for at least twenty minutes and (b) exposing to at least one chemical crosslinking agent which does not substantially affect the activity of said medicament for sufficient time to crosslink the albumin to a degree equivalent to heating at 110° to 180° C. for at least twenty minutes, and when placed in an aqueous medium, said medicament is released in a biphasic manner.

4,147,768

## ENTERIC COATED DIGOXIN AND THERAPEUTIC USE THEREOF

Richard D. Shaffer, and John J. Windheuser, both of Lawrence, Kans., assignors to Interx Research Corporation, Lawrence, Kans.

Continuation of Ser. No. 722,606, Sep. 13, 1976, abandoned. This application May 19, 1978, Ser. No. 907,489

Int. Cl.[2] A61K *9/46, 9/36, 31/705*

U.S. Cl. 424—35 6 Claims

1. A pharmaceutically acceptable enteric coated tablet for orally delivering therapeutic and undegradated levels of digoxin to a warm-blooded animal which comprises an admixture of:

(a) a cardiotonic effective amount of digoxin;

(b) a non-toxic pharmaceutically acceptable inert diluent;

(c) a non-toxic pharmaceutically acceptable effervescent couple-acid and base; and

(d) a standard non-toxic pharmaceutically acceptable enteric coating maintained over said tableted mixture of (a), (b) and (c) above.

---

4,147,769

## MICROBICIDAL COMPOSITION

Frank J. Dea, Newport Beach; William D. Fairbairn, Atherton, and Michael W. Novack, San Juan Capistrano, all of Calif., assignors to Nelson Research & Development Company, Irvine, Calif.

Continuation of Ser. No. 700,311, Jun. 28, 1976, abandoned, which is a continuation-in-part of Ser. No. 489,708, Jul. 18, 1974, abandoned. This application Jan. 9, 1978, Ser. No. 867,805

Int. Cl.[2] A61K *7/00;* A61L *9/04*

U.S. Cl. 424—47 2 Claims

2. An article of manufacture, comprising an aerosol container containing a stable composition intended for use as a deodorant/antiperspirant and containing no water, said composition comprising, on a weight basis, the following ingredients in approximately the percent amounts shown.

| Ingredient | % Wt. |
|---|---|
| Dihydroxymaleic acid | 0.5 |
| Ammonium chloride | 0.05 |
| Aluminum chlorhydrate | 4. |
| Isopropyl myristate | 3. |
| Cupric oleate | 0.03 |
| Mineral spirits | 0.02 |
| Propellant | 92.4 |

---

4,147,770

## PREPARATION FOR TREATING DERMATITIS IN THE NATURE OF TINEA PEDIS

Stephen Sichak, Dolton, Ill., assignor to Scholl, Inc., Chicago, Ill.

Filed Dec. 27, 1976, Ser. No. 754,694

Int. Cl.[2] A61L *9/04;* A01N *9/02;* A61K *31/615, 31/605*

U.S. Cl. 424—45 3 Claims

1. An antimicrobial preparation having both antifungal and antibacterial activity for the treatment of dermatitis diseases including tinea pedis which comprises a liquid for topical application to the skin including water, ethanol, salicylic acid, benzocaine, and at least 2.5% by weight of vanillin.

3. The preparation of claim 1 wherein the liquid includes an evaporable propellant.

4,147,771

## ATTRACTANT FOR ARMY CUTWORM MOTHS

Dean L. Struble, and G. Edward Swailes, both of Lethbridge, Canada, assignors to Canadian Patents and Development Limited, Ottawa, Canada

Filed Jun. 16, 1978, Ser. No. 916,227
Claims priority, application Canada, Jun. 22, 1977, 281126
Int. Cl.[2] A01N *17/14*
U.S. Cl. 424—84 5 Claims

1. An attractant composition for male moths of the army cutworm *Euxoa auxiliaris* (Grote) comprising (a) Z-5-tetradecen-1-yl acetate and (b) E-7-tetradecen-1-yl acetate in ratios of (a)/(b) within the range of about 1/99 to about 20/80.

4,147,772

## VACCINE STABILIZER

William J. McAleer, Ambler, and Henry Z. Markus, Wyncote, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 654,837, Feb. 3, 1976, abandoned. This application Feb. 23, 1978, Ser. No. 880,667
Int. Cl.[2] A61K *39/12, 39/20, 39/16, 39/34*
U.S. Cl. 424—89 10 Claims

1. A vaccine comprising an inactivated or attenuated virus and a stabilizer consisting essentially of on a parts by weight basis from about 2 to about 5 parts partially hydrolyzed gelatin having a molecular weight of about 3,000, from about 2 to about 55 parts of sorbitol, mannitol or dulcitol, from about 0.5 to about 1.7 parts of Medium 199 or equivalent cell culture medium and an amount of a physiologically acceptable acidic buffer effective to adjust the pH to from about 6.0 to about 6.5.

4,147,773

## POWDERY COMPOSITION COMPRISING VIABLE BIFIDOBACTERIA CELLS AND LACTULOSE

Katsuhiro Ogasa, Yokohama, Japan, assignor to Morinaga Milk Industry Co., Ltd., Tokyo, Japan

Filed Dec. 12, 1977, Ser. No. 859,713
Int. Cl.[2] A61K *37/00*
U.S. Cl. 424—93 5 Claims

1. A powdery composition which contains 28–57 percent by weight of lactulose, less than 2.5 percent by weight of moisture and at least $8 \times 10^{10}$ of freeze dried viable cells of genus Bifidobacterium per gram of said composition.

4,147,774

## ANTIBIOTIC SPORAMYCIN

Iwao Umezawa, Tokyo; Kanki Komiyama, and Hideo Takeshima, both of Yokohama, all of Japan, assignors to The Kitasato Institute, Tokyo, Japan

Filed Jul. 11, 1977, Ser. No. 814,665
Claims priority, application Japan, Jul. 10, 1976, 51-81470
Int. Cl.[2] A61K *35/00*
U.S. Cl. 424—118 2 Claims

1. An antibiotic sporamycin of the following properties:

(1) comprised by carbon, hydrogen, oxygen and nitrogen; elemental analysis: C: 44.72–47.38%, H: 6.4–6.88%, N: 13.99–15.0%;

(2) ultraviolet absorption spectrum: as shown in FIG. 1; absorption peaks at 285 nm (shoulder), 276 nm, 267 nm, 265 nm, 258 nm and 253 in an aqueous and 0.1 N HCl solution;
peak at 290 nm in 0.1 N NaOH solution;

(3) infrared absorption spectrum: as shown in FIG. 2; absorption peaks at 3320 $cm^{-1}$, 1640 $cm^{-1}$ and 1520 $cm^{-1}$ in KBr;

(4) white powder;

(5) solubility: soluble in water, insoluble in methanol, ethanol and acetone;

(6) color reaction:
positive: Folin-Lowry, Ehrlich and biuret reactions,
weakly positive: ninhydrin reaction,
negative: Molisch, Fehling, Tollens and anthrone reactions;

(7) molecular weight: 10,500–13,000;

(8) amino acid analysis by 6N HCl hydrolysis (110° C., 15 hrs.): at least 12 kinds of amino acids: lysine, aspartic acid, threonine, serine, glutamic acid, glycine, alanine, valine, isoleucine, leucine, tyrosine and phenylalanine;

(9) basic substance;

(10) melting point: became brown at 220°–225° C., carbonized at increased temperature; and

(11) $[\alpha]_D^{20}$: approximately $-56°$ (C=0.5, $H_2O$).

4,147,775

## ANTISEPTIC COMPOSITION

Stephen H. Schwartz, 2001 N. 51 Ave., and Alexander Buchwald, 3130 N. 49 Ave., both of Hollywood, Fla. 33021

Continuation of Ser. No. 730,008, Oct. 6, 1976, abandoned. This application Mar. 17, 1978, Ser. No. 887,547
Int. Cl.[2] A61K *33/18*
U.S. Cl. 424—150 8 Claims

4. A method for providing germicidal protection against infection to preselected portions of the human body comprising:

topically applying to said preselected portions, a germicidally effective amount of a composition of from about 2 to about 10 percent by weight of a mixture prepared by mixing 85 to 97 parts magnesium usta and 3½ to 8½ parts iodine in a pharmacologically or cosmetically acceptable vehicle.

4,147,776

## STABILIZED CHOLINE SALICYLATE COMPOUNDS

William Kelly, deceased, late of Liverpool, England, by Monica Kelly, personal representative; by John Kelly, personal representative, Great Saukey, England, and Alfred Halpein, Lake Success, N.Y., assignors to Mundipharma, AG, Rheinfelden, Switzerland

Division of Ser. No. 753,396, Dec. 22, 1976, Pat. No. 4,098,813, which is a division of Ser. No. 625,783, Oct. 24, 1975, Pat. No. 4,001,311, which is a division of Ser. No. 501,004, Sep. 3, 1974, Pat. No. 3,947,491, which is a division of Ser. No. 237,927, Mar. 24, 1972, Pat. No. 3,855,282. This application Feb. 23, 1978, Ser. No. 880,840
Claims priority, application United Kingdom, Jul. 24, 1971, 34941/71
Int. Cl.[2] A61K *31/00, 31/60*
U.S. Cl. 424—175 16 Claims

1. The method for suppressing color formation in a salicylate-containing pharmaceutical formulation comprising incorporating an effective amount of between 0.1 to 5.0 percent by weight of a choline salicylate sulfite-containing compound selected from the group consisting of choline salicylate sulfite, choline salicylate sodium sulfite, choline salicylate sodium bisulfite, choline salicylate sodium metabisulfite, choline salicylate sodium dithionate, choline salicylate sodium hydrosulfite, choline salicylate sodium hyposulfite, choline salicylate potassium sulfite, choline salicylate potassium bisulfite, choline salicylate potassium metabisulfite, choline salicylate potassium dithionate, choline salicylate potassium hydrosulfite, choline salicylate potassium hyposulfite, choline salicylate lithium sulfite, choline salicylate lithium busulfite, choline salicylate lithium metabisulfite, choline salicylate lithium dithionate, choline salicylate lithium hydrosulfite, choline salicylate lithium hyposulfite to a salicylate-containing pharmaceutical dosage form.

4,147,777

## SERICOSIDES AND METHOD OF USE

Giuseppe Mustich, Milan, Italy, assignor to Inverni Della Beffa S.p.A., Milan, Italy

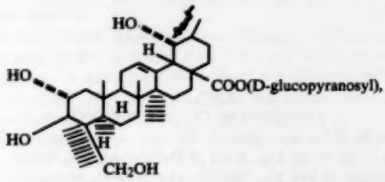
Division of Ser. No. 541,588, Jan. 16, 1975, abandoned. This application Mar. 17, 1977, Ser. No. 778,457

Claims priority, application United Kingdom, Jan. 29, 1974, 4042/74

Int. Cl.[2] A61K *31/71*; C07H *15/20*

U.S. Cl. 424—181 10 Claims

1. Sericoside, having the general formula




in pure form.

3. A method of eliciting an anti-inflammatory effect in an animal, which comprises administering, topically, orally or by injection, an anti-inflammatory amount of sericoside.

---

4,147,778

## ANTIBIOTIC BAUMYCIN COMPLEX AND COMPONENTS THEREOF

Hamao Umezawa; Tomio Takeuchi; Masa Hamada; Masaaki Ishizuka; Hiroshi Naganawa, all of Tokyo; Toshikazu Oki, Kamakurashi, and Taiji Inui, Chigasakishi, all of Japan, assignors to Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai, Tokyo, Japan

Filed May 16, 1977, Ser. No. 797,201

Claims priority, application Japan, May 31, 1976, 51-63810

Int. Cl.[2] A61K *31/71*; C07H *15/24*

U.S. Cl. 424—181 14 Claims

10. A pharmaceutical composition comprising an effective antibacterial amount of at least one antibiotic selected from the group consisting of baumycin $A_1$, $A_2$, $B_1$ or $B_2$, a non-toxic acid addition salt thereof, and a deoxyribonucleic acid complex thereof, in combination with an inert pharmaceutically acceptable carrier or diluent.

---

4,147,779

## METHOD FOR PREVENTING INTESTINAL DIVERTICULUM WITH EXPANDED FIBER BUNDLES OF ASPARAGUS

Ryoichi Naito, Ibaraki; Hirohisa Inahara, Kyoto, and Satoru Shiino, Uji, all of Japan, assignors to The Green Cross Corporation, Osaka, Japan

Filed Jun. 14, 1978, Ser. No. 915,555

Claims priority, application Japan, Oct. 20, 1977, 52-126245

Int. Cl.[2] A61K *35/78*

U.S. Cl. 424—195 1 Claim

1. A method for preventing intestinal diverticulum, which comprises adding to the diet at least 0.5 g per meal of a food additive comprising expanded fiber bundles of asparagus in powder form to supplement a fibrous component.

4,147,780

## ALPHA AMINOPHOSPHONOUS ACIDS FOR INHIBITING BACTERIA AND YEAST

John G. Dingwall, Sale; Eric K. Baylis, Stockport, both of England, and Colin D. Campbell, Beith, Scotland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

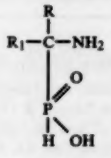
Filed May 23, 1977, Ser. No. 799,428

Claims priority, application United Kingdom, May 21, 1976, 21000/76

Int. Cl.[2] C07F *9/48*; A61K *31/66*

U.S. Cl. 424—211 12 Claims

1. A compound of the formula I




or the corresponding zwitterion form in which R and $R_1$ may be the same or different and can be hydrogen, deuterium, a lower alkyl group, a lower alkyl group substituted by one or two $—COOR_2$, $—OR_2$ or $—SR_2$ groups in which $R_2$ is hydrogen or a lower alkyl group, a lower alkenyl, a lower alkynyl, a cycloalkyl, an aryl group having 6 to 10 carbon atoms, an aryl group substituted by from one to three halogen atoms, $—COOR_5$, $—OR_5$ or $—SR_5$ groups in which $R_5$ is hydrogen or lower alkyl, a lower alkyl group substituted by aryl, or a lower alkyl group substituted by aryl having from one to three halogen atoms, $—COOR_5$, $—OR_5$ or $—SR_5$ groups in which $R_5$ is hydrogen or lower alkyl, and the salts thereof with pharmaceutically acceptable acids or bases and optical isomers thereof, with the proviso that R and $R_1$ may not both be hydrogen.

11. A pharmaceutical composition comprising a pharmaceutically effective amount of a compound as claimed in claim 1, together with a pharmaceutical excipient.

12. A method of treating microbial diseases in a mammal, which consist in administering to said mammal enterally or parenterally a composition as claimed in claim 11.

---

4,147,781

## O,S-DIALKYL O-BENZAMIDOPHENYL PHOSPHOROTHIOLATES AND PHOSPHORODITHIOATES AND PESTICIDAL METHODS

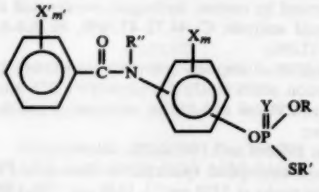
William S. Hurt, Collegeville, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.

Filed Nov. 25, 1977, Ser. No. 854,929

Int. Cl.[2] A01N *9/36*; C07F *9/165*

U.S. Cl. 424—211 18 Claims

1. A compound of the formula:




wherein

R is a ($C_1$–$C_4$)alkyl group;

R' is a ($C_3$–$C_6$)alkyl group;

R'' is a hydrogen atom, or a ($C_1$–$C_5$)alkyl group;

X is a halogen atom, a ($C_1$–$C_5$)alkyl group, or a ($C_1$–$C_5$)alkoxy group;

X' is a halogen atom, a nitro group, a cyano group, a ($C_1$–C-

5)alkyl group, a ($C_1$–$C_5$)alkoxy group, or a ($C_1$–$C_5$)alkylthio group;

Y is an oxygen atom or a sulfur atom; and

m and m' are independently an integer from 0 to 3.

2. A method of controlling pests which comprises applying directly to the pests or to the loci to be freed of or protected from attack by such pests, a pesticidally effective amount of the compound of claim 1.

---

**4,147,782**

## PHARMACEUTICAL DETERGENT COMPOSITION

**Robert W. Klein, Blue Bell, and Mary E. Foxx, Lansdale, both of Pa., assignors to William H. Rorer, Inc., Fort Washington, Pa.**

**Filed Jun. 24, 1976, Ser. No. 699,819**

**Int. Cl.[2] A61K *31/60*; C11D *7/60***

**U.S. Cl. 424—230** **4 Claims**

1. An aqueous pharmaceutical detergent composition for cleansing oily skin which comprises the following ingredients, by weight:

| | |
|---|---|
| N-Acyl ester sarcosinate salt in which the salt moiety is selected from sodium, potassium, ammonium and triethanolamine and in which the acyl ester moiety is selected from lauroyl, myristoyl and stearoyl | 8.0 to 31.0 |
| Polyvinyl pyrrolidone having an average molecular weight of 4000 to 90,000 | 0.1 to 5.0 |
| Water soluble protein hydrolysates | 0.1 to 6.0 |
| Water | Q.S. |

---

**4,147,783**

## ORAL PHARMACEUTICAL PREPARATION

**Johannes van der Vies, Oss, Netherlands, assignor to Akzona Incorporated, Asheville, N.C.**

**Continuation of Ser. No. 691,103, May 28, 1976, Pat. No. 4,098,802, which is a continuation-in-part of Ser. No. 550,397, Feb. 18, 1975, abandoned. This application Nov. 10, 1977, Ser. No. 850,181**

**Claims priority, application Netherlands, Feb. 28, 1976, 7402689**

**The portion of the term of this patent subsequent to Jul. 4, 1995, has been disclaimed.**

**Int. Cl.[2] A61K *31/56***

**U.S. Cl. 424—243** **11 Claims**

1. A pharmaceutical composition with androgenic activity adapted for oral administration, in unit dosage form, comprising, per dosage unit:

(a) an androgenically effective amount of at least one ester selected from the group consisting of esters of testosterone and 5α-dihydrotestosterone, the ester group which has been derived exclusively from an aliphatic carboxylic acid having 9–16 carbon atoms; and

(b) a pharmaceutically acceptable carrier, said carrier comprising a pharmaceutically acceptable non-steroidal lipoid substance, wherein said lipoid substance is present in an amount equal to or higher than the amount of said ester or esters.

---

**4,147,784**

## 4,5-DIHYDRO-4-OXO-1,3-DITHIOLO(4,5-d)PYRIDAZINE-2-YLIDENE-PROPANEDINITRILES

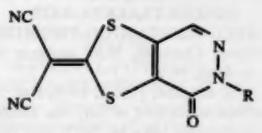
**Charles A. Wilson, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.**

**Filed Mar. 24, 1978, Ser. No. 889,807**

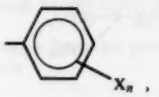
**Int. Cl.[2] C07D *495/04*; A61K *31/50***

**U.S. Cl. 424—250** **15 Claims**

1. A compound of the formula

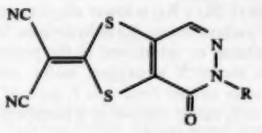


wherein R is H, an alkyl group having from 1 to 7 carbon atoms, or

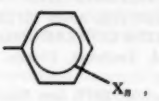


wherein X is Cl or Br and n is 0,1 or 2.

6. A method for controlling bacteria or fungi which comprises the step of applying to bacteria and/or fungi or their habitat an antimicrobially-effective amount of a compound of the formula.



wherein R is H, an alkyl group having from 1 to 7 carbon atoms, or



wherein X is Cl or Br and n is 0,1 or 2.

---

**4,147,785**

## METHOD FOR THE TREATMENT OF ONCHOCERCIASIS

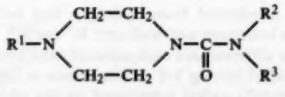
**Maurice E. Langham, Lutherville, Md., assignor to Graham J. Dobbie, Chicago, Ill., a part interest**

**Filed Mar. 18, 1977, Ser. No. 779,145**

**Int. Cl.[2] A61K *31/495***

**U.S. Cl. 424—250** **11 Claims**

1. A method of treating onchocerciasis which comprises topically administering to the skin of a human patient suffering from an infestation of Onchocerca volvulus a topical composition which comprises a dermatologically acceptable aqueous carrier suitable for topical application and having dispersed therein a piperazine derivative selected from the group consisting of a compound having the general formula



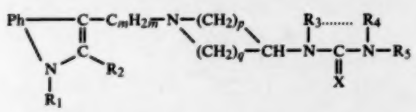
wherein $R^1$ is a mamber of the group consisting of hydrogen and alkyl radicals containing 1 to 8 carbon atoms and $R^2$ and $R^3$ are members of the group consisting of hydrogen and alkyl radicals containing 1 to 8 carbon atoms, with the proviso that at least one of said $R^2$ and $R^3$ is said alkyl radical, and the corresponding physiologically tolerable acid addition salts thereof; said topical composition being administered to the skin of said patient in an amount sufficient to decrease the skin count of microfilariae of said *Ochocerca volvulus*.

## 4,147,786
## 1-INDOLYLALKYL-3-OR 4-TRIMETHYLENEURIDO-PIPERIDINES

Charles F. Huebner, Chatham, N.J., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 654,254, Feb. 2, 1976, Pat. No. 4,073,911, which is a continuation-in-part of Ser. No. 556,600, Mar. 10, 1975. This application May 16, 1977, Ser. No. 797,151
Int. Cl.[2] A61K *31/505*; C07D *401/14*
U.S. Cl. 424—251 8 Claims

1. A compound of the formula



wherein Ph is unsubstituted 1,2-phenylene or 1,2-phenylene substituted by one member selected from lower alkyl, hydroxy, mercapto, lower alkoxy, lower alkenedioxy having 1 or 2 carbon atoms, benzyloxy, lower alkylmercapto, halogeno, triflouromethyl, nitro and amino; each of $R_1$ and $R_2$ is hydrogen or lower alkyl; $(R_3+R_4)$ is lower alkylene separating both nitrogens by 3 carbon atoms; $R_5$ is hydrogen, lower alkyl or phenyl unsubstituted or substituted in the positions 3 to 6 as defined for Ph above; X is oxygen, sulfur, imino or lower alkylimino; m is an integer from 1 to 7; each of p and q is an integer from 1 to 3, but $(p+q)=4$; or a therapeutically acceptable acid addition salt thereof.

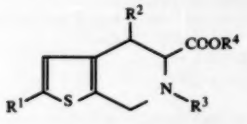
---

## 4,147,787
## 4,5,6,7-TETRAHYDRO-THIENO[2,3-c]-AND [3,2-c]-PYRIDINES, AND THERAPEUTIC COMPOSITIONS CONTAINING THE SAME

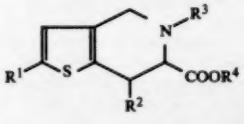
Jean-Pierre Maffrand, Toulouse, France, assignor to Parcor, Paris, France

Filed Dec. 27, 1977, Ser. No. 864,939
Claims priority, application France, Jan. 7, 1977, 77 00408
Int. Cl.[2] A61K *31/44*; C07D *495/04*
U.S. Cl. 424—256 3 Claims

1. Compound selected from the compounds having the formulae:



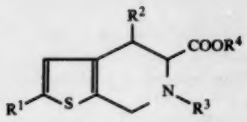
(I) and



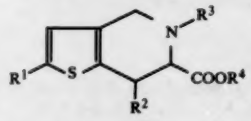
(II)

in which $R^1$ is selected from hydrogen and halogen; $R^2$ is selected from hydrogen and hydroxy; $R^3$ and $R^4$, which may be the same or different, are each selected from hydrogen, $C_{1-6}$ alkyl, phenylalkyl having 1–6 carbon atoms in the alkyl moiety, and phenyl-$C_{1-6}$ alkyl substituted on the phenyl nucleus with at least one substituent selected from halogen, $C_{1-6}$ alkyl, $C_{1-6}$ alkoxy, hydroxy, nitro, cyano and trifluoromethyl; and their therapeutically acceptable acid addition salts.

2. Therapeutic composition having an anti-sludge, anti-thrombosis and blood-platelet aggregation inhibiting activity comprising, as active ingredient, an effective anti-sludge or anri-thrombosis or blood-platelet aggregation inhibiting amount of a compound selected from the compounds having the formulae:



(I) and



(II)

in which $R^1$ is selected from hydrogen and halogen; $R^2$ is selected from hydrogen and hydroxy; $R^3$ and $R^4$, which may be the same or different, are each selected from hydrogen, $C_{1-6}$ alkyl, phenylalkyl having 1–6 carbon atoms in the alkyl moiety, and phenyl-$C_{1-6}$ alkyl substituted on the phenyl nucleus with at least one substituent selected from halogen, $C_{1-6}$ alkyl, $C_{1-6}$ alkoxy, hydroxy, nitro, cyano and trifluoromethyl; and their therapeutically acceptable acid addition salts, together with a pharmaceutically acceptable carrier.

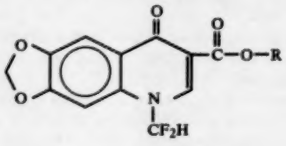
---

## 4,147,788
## ANTIBACTERIALS: 1-DIFLUOROMETHYL-6,7-METHYLENEDIOXY-1,4-DIHYDRO-4-OXO-3-QUINOLINECARBOXYLIC ACID AND ITS ESTERS

Kyu T. Lee, Wilmington, Del., assignor to E. I. DuPont de Nemours and Company, Wilmington, Del.

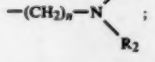
Continuation-in-part of Ser. No. 660,852, Feb. 23, 1976, abandoned. This application Jan. 14, 1977, Ser. No. 758,331
Int. Cl.[2] A61K *31/47*; C07D *491/04*
U.S. Cl. 424—258 15 Claims

1. A compound of the formula:



where

R = hydrogen or



;

$R_1$ and $R_2$ independently = $C_1$-$C_3$ alkyl; and

n = 2 or 3;

and its pharmaceutically suitable salts.

6. A pharmaceutical composition for antibacterial use comprising a suitable pharmaceutical carrier and a compound of claim 1.

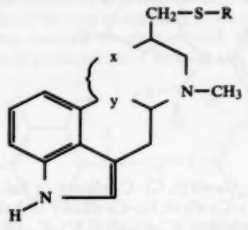
11. A method of alleviating bacterial infection in a mammal which comprises internally administering to the mammal an effective antibacterial amount of a compound of claim 1.

## 4,147,789
## 6-METHYL-8-THIOMETHYL-ERGOLENE DERIVATIVES

Peter Stütz, Bottmingen, and Paul Stadler, Biel-Benken, both of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

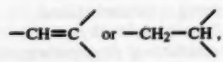
Continuation-in-part of Ser. No. 556,336, Mar. 7, 1975, abandoned. This application Sep. 27, 1976, Ser. No. 726,981
Claims priority, application Switzerland, Mar. 14, 1974, 3563/74; Jul. 23, 1974, 10138/74; United Kingdom, Jan. 2, 1976, 49/76
Int. Cl.[2] C07D *457/02;* N61K *31/48*
U.S. Cl. 424—261 36 Claims

1. A compound of formula I,



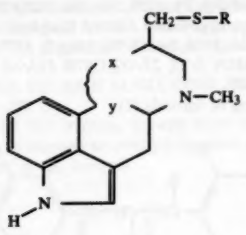
I

wherein
xy is the group

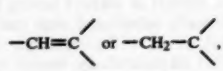


and
R is pyridyl, thienyl, oxazolyl, thiazolyl, imidazolyl, pyrimidinyl, 1,2,4-triazolyl or 1,3,5-triazinyl or 2- or 4-pyridyl mono-substituted by lower alkyl of 1 to 4 carbon atoms, lower alkoxy of 1 to 4 carbon atoms or fluorine, chlorine, or bromine,
or a pharmaceutically acceptable acid addition salt thereof.

32. A method of treating Morbus Parkinson in animals which comprises administering to an animal in need of such treatment a therapeutically effective amount of a compound of the formula



wherein
x y is the group



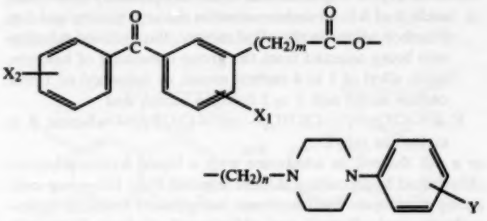
and
R is hydrogen, cyano, pyridyl, thienyl, oxazolyl, thiazolyl, imidazolyl, pyrimidinyl, 1,2,4-triazolyl or 1,3,5-triazinyl or 2- or 4-pyridyl mono-substituted by alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, fluorine, chlorine or bromine,
or a pharmaceutically acceptable acid addition salt thereof.

## 4,147,790
## (4-PHENYL-PIPERAZINO ALKYL)-3-BENZOYL-BENZENE ALKANOATES

André Allais, Gagny; Francois Clémence, Paris, and Roger Deraedt, Pavillons-sous-Bois, all of France, assignors to Roussel Uclaf, Paris, France

Filed Jan. 13, 1978, Ser. No. 869,361
Claims priority, application France, Jan. 21, 1977, 77 01712; Oct. 17, 1977, 77 31164
Int. Cl.[2] A61K *31/495;* C07D *295/14*
U.S. Cl. 424—250 19 Claims

1. A compound selected from the group consisting of a compound of the formula



wherein $X_1$ is selected from the group consisting of hydrogen and alkyl of 1 to 5 carbon atoms, $X_2$ is selected from the group consisting of hydrogen, halogen and alkoxy of 1 to 5 carbon atoms, m is a whole number from 1 to 10, n is a whole number from 2 to 5 and Y is in the 2,3 or 4-position and is selected from the group consisting of hydrogen, halogen, $CF_3$—, $CF_3O$—, $CF_3S$—, alkyl of 1 to 8 carbon atoms and alkoxy of 1 to 8 carbon atoms and their non-toxic, pharmaceutically acceptable acid addition salts.

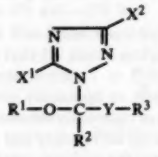
15. An analgesic composition comprising an analgesically effective amount of at least one compound of claim 1 and an inert pharmaceutical carrier.

## 4,147,791
## 1-SUBSTITUTED-1,2,4-TRIAZOLE FUNGICIDAL COMPOSITIONS AND METHODS FOR COMBATTING FUNGI THAT INFECT OR ATTACK PLANTS

Werner Meiser; Karl H. Büchel; Wolfgang Krämer, all of Wuppertal, and Ferdinand Grewe, Burscheid, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 318,963, Dec. 27, 1972, Pat. No. 3,912,752. This application Feb. 14, 1975, Ser. No. 550,242
Claims priority, application Fed. Rep. of Germany, Jan. 11, 1972, 2201063
Int. Cl.[2] A01N *9/22, 21/00*
U.S. Cl. 424—269 3 Claims

1. A fungicidal composition comprising a fungicidally effective amount of a 1-substituted-1,2,4-triazole of the formula



in which
$X^1$ and $X^2$ each independently is hydrogen or alkyl of 1 to 3 carbon atoms,
$R^1$ is alkyl of 1 to 8 carbon atoms, alkenyl of 2 to 6 carbon atoms, alkynyl of 2 to 6 carbon atoms, cycloalkyl of 5 to 7 carbon atoms, cycloalkenyl of 5 to 7 carbon atoms, or

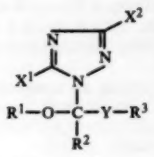
optionally substituted aryl of 6 to 10 carbon atoms or optionally substituted aralkyl of 6 to 10 carbon atoms in the aryl moiety and 1 to 2 carbon atoms in the alkyl moiety, the optional substituents being selected from the group consisting of halogen, nitro, amino, alkyl of 1 to 6 carbon atoms, alkoxy of 1 to 4 carbon atoms, alkylthio of 1 to 4 carbon atoms, haloalkyl of 1 to 2 carbon atoms and 1 to 5 halogen atoms, haloalkylthio of 1 to 2 carbon atoms and 3 to 5 halogen atoms, haloalkylsulfonyl of 1 to 2 carbon atoms and 1 halogen atom and o- or p-linked phenyl,

$R_2$ and $R^3$ each independently is hydrogen, alkyl of 1 to 8 carbon atoms, alkenyl of 2 to 6 carbon atoms, alkynyl of 2 to 6 carbon atoms, cycloalkyl of 5 to 7 carbon atoms, cycloalkenyl of 5 to 7 carbon atoms, or optionally substituted aryl of 6 to 10 carbon atoms or optionally substituted aralkyl of 6 to 10 carbon atoms in the aryl moiety and 1 to 2 carbon atoms in the alkyl moiety, the optional substituents being selected from the group consisting of halogen, nitro, alkyl of 1 to 4 carbon atoms, or haloalkyl of 1 or 2 carbon atoms and 1 to 5 halogen atoms, and

Y is —C(O)—, —$C(OH)_2$— or —$C(OR)_2$— wherein R is methyl or ethyl,

or a salt thereof, in admixture with a liquid hydrocarbon or chlorinated hydrocarbon diluent selected from the group consisting of aromatic hydrocarbons, halogenated aromatic hydrocarbons, cycloalkanes, and chlorinated aliphatic hydrocarbons.

**2**. The method of combating fungi that infect or attack plants which comprises applying to plants, seed or soil a fungicidally effective amount of a 1,2,4-triazole derivative of the formula



in which

$X^1$ and $X^2$ each independently is hydrogen or alkyl of 1 to 3 carbon atoms,

$R^1$ is alkyl of 1 to 8 carbon atoms, alkenyl of 2 to 6 carbon atoms, alkynyl of 2 to 6 carbon atoms, cycloalkyl of 5 to 7 carbon atoms, cycloalkenyl of 5 to 7 carbon atoms, or optionally substituted aryl of 6 to 10 carbon atoms or optionally substituted aralkyl of 6 to 10 carbon atoms in the aryl moiety and 1 to 2 carbon atoms in the alkyl moiety, the optional substituents being selected from the group consisting of halogen, nitro, amino, alkyl of 1 to 6 carbon atoms, alkoxy of 1 to 4 carbon atoms, alkylthio of 1 to 4 carbon atoms, haloalkyl of 1 to 2 carbon atoms and 1 to 5 halogen atoms, haloalkylthio of 1 to 2 carbon atoms and 3 to 5 halogen atoms, haloalkylsulfonyl of 1 to 2 carbon atoms and 1 halogen atom and o- or p-linked phenyl,

$R_2$ and $R^3$ each independently is hydrogen, alkyl of 1 to 8 carbon atoms, alkenyl of 2 to 6 carbon atoms, alkynyl of 2 to 6 carbon atoms, cycloalkyl of 5 to 7 carbon atoms, cycloalkenyl of 5 to 7 carbon atoms, or optionally substituted aryl of 6 to 10 carbon atoms or optionally substituted aralkyl of 6 to 10 carbon atoms in the aryl moiety and 1 to 2 carbon atoms in the alkyl moiety, the optional substituents being selected from the group consisting of halogen, alkyl of 1 to 6 carbon atoms, or haloalkyl of 1 or 2 carbon atoms and 1 to 5 halogen atoms, and

Y is —C(O)—, —$C(OH)_2$— or —$C(OR)_2$— wherein R is methyl or ethyl,

or a salt thereof.

## 4,147,792
## FUNGICIDAL COMPOSITIONS

**Walter Kunz, Oberwil, Switzerland; Wolfgang Eckhardt, Lorrach, Fed. Rep. of Germany, and Adolf Hubele, Magden, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

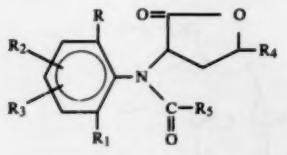
**Filed Jan. 30, 1978, Ser. No. 873,585**

**Claims priority, application Switzerland, Feb. 4, 1977, 1381/77; Mar. 28, 1977, 3884/77**

**Int. Cl.**[2] **A01N** *9/22, 9/28;* **C07D** *307/58, 405/12*

**U.S. Cl. 424—269** **9 Claims**

**1**. A compound of the formula I



(I)

wherein

R represents $C_1$–$C_4$-alkyl, $C_1$–$C_4$-alkoxy or halogen,

$R_1$ represents $C_1$–$C_3$-alkyl, $C_1$–$C_4$-alkoxy or halogen,

$R_2$ represents hydrogen, $C_1$–$C_3$-alkyl, $C_1$–$C_4$-alkoxy or halogen,

$R_3$ represents hydrogen or methyl, with the total number of C atoms of the substituents R, $R_1$, $R_2$ and $R_3$ in the phenyl ring not exceeding the number 8,

$R_4$ represents hydrogen or methyl, and

$R_5$ represents 1,2,4-triazolylmethyl.

**3**. Process for combatting phytopathogenic fungi, which process comprises applying to the locus thereof a fungicidally effective amount of a compound of the formula I according to claim **1**.

**6**. A fungicidal composition containing as active substance a fungicidally effective amount of a compound of formula I of claim **1**, together with a suitable inert carrier therefor.

---

## 4,147,793
## FUNGICIDAL AZOLYL-SUBSTITUTED ARYL ARALKYLKETONE COMPOUNDS

**Margaret C. Shephard, and Paul A. Worthington, both of Maidenhead, England, assignors to Imperial Chemical Industries Limited, London, England**

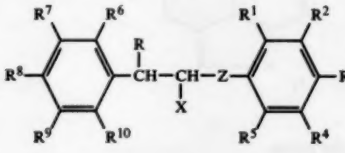
**Filed Jul. 29, 1977, Ser. No. 820,629**

**Claims priority, application United Kingdom, Jul. 29, 1976, 31650/76; Dec. 24, 1976, 54111/76; May 5, 1977, 18863/77**

**Int. Cl.**[2] **A01N** *9/22, 21/00;* **C07D** *233/60, 249/08*

**U.S. Cl. 424—269** **33 Claims**

**1**. A compound of formula (I):



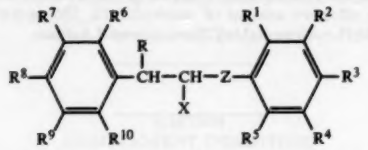
wherein R is alkyl, alkenyl or alkynyl having up to 4 carbon atoms, phenyl optionally substituted with one, two or three halogen, $C_{1-4}$ alkyl, nitro, trifluoromethyl, cyano, phenyl, $C_{1-4}$ alkoxy or ($C_{1-4}$ alkylene)dioxy, benzyl optionally ring-substituted with one, two or three halogen, $C_{1-4}$ alkyl, nitro, trifluoromethyl, cyano, phenyl, $C_{1-4}$ alkoxy or ($C_{1-4}$ alkylene)-dioxy and/or substituted on the α-carbon atom with alkyl, alkenyl or alkynyl having up to 4 carbon atoms, phenyl, benzyl, cyano, ($C_{1-4}$ alkoxy)carbonyl or trihalomethyl, Z is C=O, each of $R^1$ to $R^{10}$, which may be the same or different, is hydrogen, halogen, phenyl, $C_{1-4}$ alkyl, $C_{1-4}$ alkoxy, nitro or mono- or di-($C_{1-4}$ alkyl)-, phenyl- or benzyl-substituted or

unsubstituted amino, at least six of $R^1$ to $R^{10}$ being hydrogen, and X is 1,2,4-triazol-1-yl, or an acid addition salt or metal complex thereof.

**9.** A fungicidal composition consisting essentially of, as active ingredient, a fungicidally effective amount of a compound, salt or complex as claimed in claim **1**, and a carrier for the active ingredient.

**17.** A method of combating fungal diseases in a plant, the method consisting essentially of the step of applying to the plant, to seed of the plant or to the locus of the plant or seed, a fungicidally effective amount of a compound, salt or complex as claimed in claim **1**.

**25.** A method of combating a fungal disease in a plant, said fungal disease caused by Venturia species, the method consisting essentially of the step of applying to the plant, to seed of the plant or to the locus of the plant or seed, a fungicidally effective amount of a compound of formula (I):



wherein R is alkyl, alkenyl or alkynyl having up to 4 carbon atoms, phenyl optionally substituted with one, two or three halogen, $C_{1-4}$ alkyl, nitro, trifluoromethyl, cyano, phenyl, $C_{1-4}$ alkoxy or ($C_{1-4}$ alkylene)dioxy, benzyl optionally ring-substituted with one, two or three halogen, $C_{1-4}$ alkyl, nitro, trifluoromethyl, cyano, phenyl, $C_{1-4}$ alkoxy or ($C_{1-4}$ alkylene)-dioxy or substituted on the α-carbon atom with alkyl, alkenyl or alkynyl having up to 4 carbon atoms, phenyl, benzyl, cyano, ($C_{1-4}$ alkoxy)carbonyl or trihalomethyl, Z is C=O, each of $R^1$ to $R^{10}$, which may be the same or different, is hydrogen, halogen, phenyl, $C_{1-4}$ alkyl, $C_{1-4}$ alkoxy, nitro or mono- or di-($C_{1-4}$ alkyl)-, phenyl- or benzyl-substituted or unsubstituted amino, at least six of $R^1$ to $R^{10}$ being hydrogen, and X is 1,2,4-triazol-1-yl, or an acid addition salt or metal complex thereof.

---

## 4,147,794
## TREATMENT OF HYPERTENSION WITH THIADIAZOLES

**Stephen Turner, Swanland, England, assignor to Reckitt & Colman Products Limited, London, England**

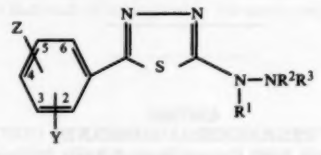
**Filed Jun. 8, 1977, Ser. No. 804,728**

**Claims priority, application United Kingdom, Jun. 17, 1976, 25079/76**

**Int. Cl.**[2] **A61K** *31/425;* **C07D** *275/00*

**U.S. Cl. 424—270** **12 Claims**

**1.** A method for treating hypertension which comprises administering to humans an antihypertensive effective amount of a compound of the formula



I

wherein

$R^1$ is hydrogen or methyl;

$R^2$ is hydrogen, alkyl $C_{1-4}$ or acetyl;

$R^3$ is hydrogen or alkyl $C_{1-4}$;

Z is hydrogen, methyl, methoxy, fluoro, or chloro;

Y is alkyl $C_{1-7}$, alkoxy $C_{1-6}$, fluoro, chloro, bromo, iodo, alkylsulphinyl $C_{1-4}$, trifluoromethyl, methylthio, nitro, phenyl or substituted phenyl at the 2-position; or when Z is hydrogen, Y may be hydrogen or may be chloro, methyl or hydroxy at the 3- or 4-positions; or a pharmaceutically acceptable acid addition salt thereof.

---

## 4,147,795
## HYDANTOIN DERIVATIVES AS THERAPEUTIC AGENTS

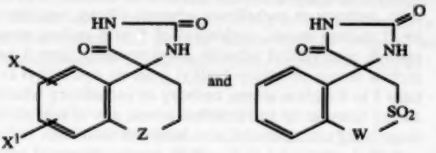
**Reinhard Sarges, Mystic, Conn., assignor to Pfizer Inc., New York, N.Y.**

**Division of Ser. No. 767,803, Feb. 11, 1977, which is a continuation-in-part of Ser. No. 733,062, Oct. 18, 1976, abandoned. This application Nov. 8, 1977, Ser. No. 849,546**

**Int. Cl.**[2] **A61K** *31/415*

**U.S. Cl. 424—273 R** **7 Claims**

**1.** A method of treating a diabetic host to prevent or alleviate ocular and neuritic diabetes-associated chronic complications, which comprises orally, parenterally or topically administering to said host an effective amount of a compound selected from the group consisting of those of the formulae:



and the base salts thereof with pharmacologically acceptable cations, wherein

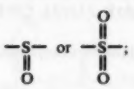
W is $-(CH_2)_n-$;

X is hydrogen and $X^1$ is hydrogen, hydroxy, fluorine, chlorine, bromine, lower alkyl or lower alkoxy; or

X and $X^1$, when taken separately, are each chlorine, lower alkyl or lower alkoxy and when taken together are $-OCH_2(CH_2)_nO-$;

Y is oxygen or sulfur;

Z is Y or Q wherein Q is



and

n is zero or one.

---

## 4,147,796
## 1-(3-HYDROXYALK-1-yl)-5-(CARBOXYALKYL)HYDANTOIN DERIVATIVES

**Gordon Wootton, Sawbridgeworth, England, assignor to Beecham Group Limited, Great Britain**

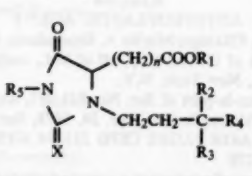
**Continuation-in-part of Ser. No. 858,562, Dec. 8, 1977, abandoned. This application Jun. 14, 1978, Ser. No. 915,164**

**Claims priority, application United Kingdom, Dec. 18, 1976, 52955/76; Jul. 20, 1977, 30369/77**

**Int. Cl.**[2] **A61K** *31/415;* **C07D** *233/78, 233/86*

**U.S. Cl. 424—273 R** **32 Claims**

**1.** A compound of the formula:



or a pharmaceutically acceptable salt thereof, wherein X is O or S;

n has a value of from 1 to 8;

$R_1$ is hydrogen; alkyl; phenyl or aralkyl of up to 12 carbon atoms;

$R_2$ when taken alone is hydrogen; alkyl of 1 to 4 carbon atoms; or phenyl;

$R_3$ is hydroxy, alkanoyloxy of 1 to 4 carbon atoms or benzyloxy;

$R_4$ when taken alone is hydrogen; alkyl of 1 to 9 carbon atoms; cycloalkyl of 3 to 8 carbon atoms; phenyl; naphthyl; or alkyl of 1 to 6 carbon atoms substituted with phenyl, naphthyl or cycloalkyl of 3 to 8 carbon atoms; any of said phenyl rings and said naphthyl rings being unsubstituted or substituted with halo, trifluoromethyl, alkyl of 1 to 6 carbon atoms, hydroxy, alkoxy of 1 to 6 carbon atoms, phenylalkoxy wherein alkoxy contains from 1 to 6 carbon atoms or nitro;

$R_2$ and $R_4$ taken together, together with the carbon atom to which they are joined, are cycloalkylidene of 5 to 8 carbon atoms;

$R_5$ is alkyl of 1 to 6 carbon atoms unsubstituted or substituted with nitro, hydroxy, alkoxy of 1 to 6 carbon atoms, cyano, halo, carboxy or carbalkoxy wherein alkoxy contains up to 12 carbon atoms, cycloalkyl of 5 to 8 carbon atoms; phenyl; phenylalkyl wherein alkyl contains from 1 to 6 carbon atoms; phenylcycloalkyl wherein cycloalkyl contains 3 to 6 carbon atoms; carboxy or carbalkoxy wherein alkoxy contains up to 12 carbon atoms; any of said phenyl rings being unsubstituted or substituted with halo, trifluoromethyl, alkyl of 1 to 6 carbon atoms, alkoxy of 1 to 6 carbon atoms or nitro.

32. The method of effecting a prostaglandin-like response in humans and other animals which comprises administering thereto an effective amount of a compound according to claim 1.

---

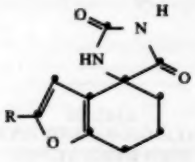
4,147,797

## SPIRO-FURANOHYDANTOIN DERIVATIVES

Paul R. Kelbaugh, Niantic, and Reinhard Sarges, Mystic, both of Conn., assignors to Pfizer Inc., New York, N.Y.

Filed Aug. 11, 1978, Ser. No. 932,990
Int. Cl.[2] A61K *31/415;* C07D *491/10*
U.S. Cl. 424—273 R 3 Claims

1. A spiro-furanohydantoin compound of the formula



or its pharmaceutically acceptable metal salt, wherein R is hydrogen, methyl, fluoro, chloro or bromo.

3. A method for the treatment of a diabetic host to prevent or alleviate diabetes-associated complications which comprises administering to the host an effective amount of a compound of claim 1.

---

4,147,798

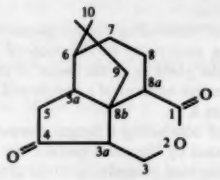
## ANTINEOPLASTIC AGENT

Gary J. Calton, Elkridge; Marlin A. Espenshade, and Richard L. Ranieri, both of Ellicott City, all of Md., assignors to W. R. Grace & Co., New York, N.Y.

Continuation-in-part of Ser. No. 821,087, Aug. 2, 1977, abandoned. This application Apr. 24, 1978, Ser. No. 899,616
Int. Cl.[2] A61K *31/365;* C07D *311/94;* C12D *13/00*
U.S. Cl. 424—279 7 Claims

1. The process of producing a complex quadracyclic lactone designated as quadrone, which comprises cultivating the microorganism *Aspergillus terreus* NRRL 11156 under submerged aerobic conditions in an aqueous carbohydrate solution containing a nitrogenous nutrient until a substantial amount of quadrone is produced.

6. Octahydro-10, 10-dimethyl-6,8b-ethano-8bH-cyclopenta[-de][2]benzopyran-1,4-dione corresponding to the structural formula:



7. A method of inhibiting the growth of tumorous human nasopharynx cells in mice comprising inoculating said cells with an effective amount of octahydro-10, 10dimethyl-6,8b-ethano-8bH-cyclopenta[de][2]benzopyran-1,4-dione.

---

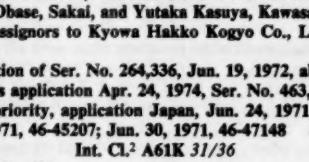
4,147,799

## PROCESS FOR REDUCING BLOOD PRESSURE AND BLOCKING β-ADRENERGIC RECEPTOR

Hiroyuki Obase, Sakai, and Yutaka Kasuya, Kawasaki, both of Japan, assignors to Kyowa Hakko Kogyo Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 264,336, Jun. 19, 1972, abandoned. This application Apr. 24, 1974, Ser. No. 463,833
Claims priority, application Japan, Jun. 24, 1971, 46-45206; Jun. 24, 1971, 46-45207; Jun. 30, 1971, 46-47148
Int. Cl.[2] A61K *31/36*
U.S. Cl. 424—282 8 Claims

1. A process for reducing blood pressure and blocking β-adrenergic receptor, which comprises the administration of an effective amount of a composition comprising as its active ingredient a 1-(3,4-methylenedioxyphenyl)-2-alkylaminoethanol compound represented by the formula:



wherein R is an alkyl group having 2 to 6 carbon atoms, or a pharmaceutically acceptable acid addition salt thereof.

---

4,147,800

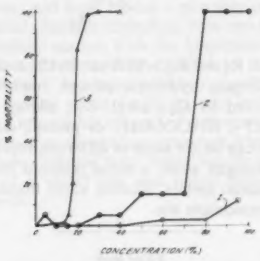
## PEDICULICIDAL TOXICANTS

Arnold J. Singer, South Orange; Myron J. Lover, Mountainside; William E. Rhodes, III, Roselle; William N. Bilodeau, Parsippany, and Donald M. Lynch, Union, all of N.J., assignors to Block Drug Company, Inc., Kenilworth, N.J.

Filed Jan. 17, 1977, Ser. No. 759,638
Int. Cl.[2] A01N *9/02;* A61K *31/23, 31/045, 31/22*
U.S. Cl. 424—312 17 Claims

1. A method of controlling lice which comprises applying to a host in need of such control a pediculicidal toxic amount of a mixture of (1) at least one aliphatic alcohol of 2 to about 8

carbon atoms and (2) at least one aliphatic carboxylic acid ester of 4 to about 32 carbon atoms, wherein the ratio of said alcohol



to said ester is present in a synergistically effective amount of about 1.1:1 to 3:1.

---

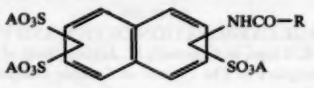
4,147,801

## COMPLEMENT INHIBITORS

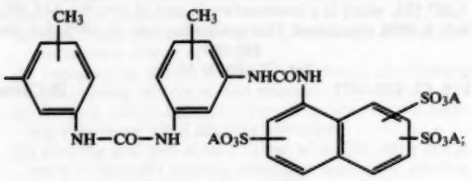
Robert H. Lenhard, Paramus, N.J., and Seymour Bernstein, New City, N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 684,599, May 10, 1976, Pat. No. 4,087,548. This application Feb. 6, 1978, Ser. No. 875,704
Int. Cl.[2] A61K *31/185*
U.S. Cl. 424—315 7 Claims

1. A method of inhibiting the complement system in a body fluid which comprises subjecting said body fluid to the action of an effective complement inhibiting amount of a compound of the formula:



wherein R is



and A is hydrogen, alkali metal or alkaline earth, with the proviso that each A is identical in the same compound.

---

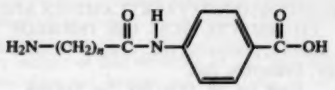
4,147,802

## METHOD OF TREATING BACTERIAL INFECTIONS

Elton S. Cook, Cincinnati, Ohio, and Akira Fujii, Matsudo, Japan, assignors to Stanley Drug Products, Inc., Portland, Oreg.

Filed Mar. 17, 1978, Ser. No. 888,011
Int. Cl.[2] A61K *31/195*
U.S. Cl. 424—319 6 Claims

1. A method of treating bacterial infections in mammals comprising administering to a mammal suffering from said bacterial infection an antibacterial effective amount of a para-substituted benzoic acid having the formula



wherein n is a natural number 1 through 5.

---

4,147,803

## NONIONIC SURFACE ACTIVE ANTI-VIRAL AGENTS

Samuel S. Asculai, Hampton, N.J.; Alfred B. Kupferberg, deceased, late of Somerville, N.J. by Beatrice Kupferberg, coexecutor, and by Meyer Halpern, coexecutor, Lauderhill, Fla., assignors to Ortho Pharmaceutical Corp., Raritan, N.J.

Division of Ser. No. 529,180, Dec. 3, 1974, Pat. No. 4,020,183. This application Dec. 13, 1976, Ser. No. 749,957
Int. Cl.[2] A61K *31/16, 31/335, 31/35, 31/34*
U.S. Cl. 424—320 3 Claims

1. A method of inactivating herpes simplex virus infectivity in humans which comprises applying to the affected area an effective amount for treating herpes simplex virus of lauric diethanolamide in a pharmaceutically acceptable carrier.

---

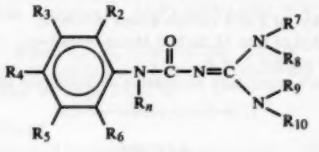
4,147,804

## AMIDINOUREA LOCAL ANESTHETICS

Julius Diamond, Morris Plains, N.J., and George H. Douglas, Malvern, Pa., assignors to William H. Rorer, Inc., Fort Washington, Pa.

Division of Ser. No. 671,762, Mar. 30, 1976, abandoned, which is a continuation-in-part of Ser. No. 558,187, Mar. 31, 1975, Pat. No. 4,060,635. This application May 25, 1977, Ser. No. 800,496
Int. Cl.[2] A61K *31/17*
U.S. Cl. 424—322 10 Claims

1. A method for producing local anesthetic action in a patient which comprises administering parenterally to said patient an effective daily dosage of between 0.1 and 70 mg/kg of body weight of said patient a compound of the formula:



where:

$R_2$, $R_3$, $R_4$, $R_5$ and $R_6$ may be the same or different and are:
hydrogen,
halo,
loweralkyl,
halololoweralkyl,
nitro,
amino,
acylamino or
loweralkoxy;

$R_n$ is hydrogen or loweralkyl; and

$R_7$, $R_8$, $R_9$ and $R_{10}$ are:
hydrogen,
alkyl,
alkenyl,
alkynyl,
cycloalkyl,
cycloalkenyl,
cycloalkylloweralkyl,
alkoxyloweralkyl,
aralkoxyloweralkyl or
aralkyl;

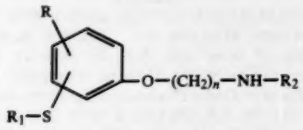
and the non-toxic acid addition salts thereof.

## 4,147,805
## ALKYLTHIOPHENOXYALKYLAMINES AND THE PHARMACEUTICAL USE THEREOF

**Duane F. Morrow, Evansville, Ind., assignor to Mead Johnson & Company, Evansville, Ind.**

**Filed Jul. 28, 1978, Ser. No. 928,668**
**Int. Cl.[2] A61K *31/135*; C07C *93/06***
**U.S. Cl. 424—330** **21 Claims**

**1.** A compound of the formula



wherein

R is hydrogen or lower alkyl of 1 to 4 carbon atoms inclusive;

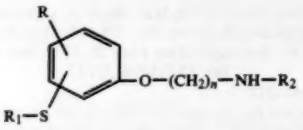
$R_1$ is alkyl of 1 to 8 carbon atoms inclusive;

$R_2$ is alkyl of 6 to 12 carbon atoms inclusive;

n is the integer 2 or 3;

or the pharmaceutically acceptable acid addition salts thereof.

**17.** The therapeutic process of treating vascular disease which comprises administering to a mammal requiring vasodilation an effective vasodilating amount of a compound of the formula



wherein

R is hydrogen or lower alkyl of 1 to 4 carbon atoms inclusive;

$R_1$ is alkyl of 1 to 8 carbon atoms inclusive;

$R_2$ is alkyl of 6 to 12 carbon atoms inclusive;

n is the integer 2 or 3;

or the pharmaceutically acceptable acid addition salts thereof.

---

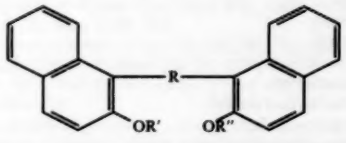
## 4,147,806
## ANTI-INFLAMMATORY AND ANALGESIC MEDICAMENTS

**Jean-Pierre Poupelin, Olivet, France, assignor to Laboratoires Creat, Vernouillet, France**

**Filed Nov. 24, 1975, Ser. No. 634,342**
**Claims priority, application France, Nov. 29, 1974, 74 39163**
**Int. Cl.[2] A61K *31/045, 31/085, 31/09, 31/135***
**U.S. Cl. 424—343** **13 Claims**

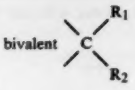
**1.** Method of treating patient suffering from painful and inflammatory conditions comprising administering to the patient, in an analgesic and anti-inflammatory effective amount, a composition comprising a pharmaceutical carrier and, as active principle,

at least one compound of the formula:



wherein:

R is a



radical in which $R_1$ and $R_2$, which can be the same or different, represent hydrogen, hydroxyl, phenyl, naphthyl, alkyl, or phenyl substituted by $C_{1-3}$ alkyl, $C_{1-2}$ alkoxy, halogen, hydroxy, $NH_2$, $CF_3$, $NHOCOCH_3$, or phenyl; and wherein R' and R", which can be the same or different, represent a hydrogen atom, a halogen atom, a metal selected from the group consisting of alkali metals, alkaline earth metals and magnesium, or the ammonium ion.

---

## 4,147,807
## PROCESS FOR THE TREATMENT OF MEAT WITH COMPOSITIONS INCLUDING *MICROCOCCUS VARIANS* AND A LACTIC ACID PRODUCING BACTERIA

**Alfred J. Gryczka, Sarasota, and Ramesh B. Shah, Bradenton, both of Fla., assignors to Microlife Technics, Inc., Sarasota, Fla.**

**Filed Sep. 6, 1977, Ser. No. 830,917**
**Int. Cl.[2] A23B *4/12***
**U.S. Cl. 426—56** **6 Claims**

**1.** In the process for producing dry and semi-dry sausage and other fermented meat products wherein meat is mixed with spices, nitrites or nitrates and then fermented the improvement which comprises:

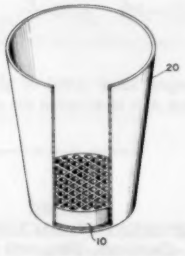
fermenting meat with a composition which comprises as the active ingredients a *Micrococcus varians* NRRL-B-11,060 and at least one lactic acid producing bacterium to lower the pH to between 5.4 and 4.8 without added acid producing chemicals which lower the pH more rapidly than the lactic acid producing bacteria.

---

## 4,147,808
## BEVERAGE CARBONATION DEVICE AND PROCESS

**Alexander L. Liepa, and Cornelis H. Japikse, both of Cincinnati, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio**

**Division of Ser. No. 739,663, Nov. 8, 1976, Pat. No. 4,110,255, which is a division of Ser. No. 489,292, Jul. 7, 1974, Pat. No. 4,007,134, which is a continuation-in-part of Ser. No. 445,200, Feb. 5, 1974, abandoned. This application Apr. 25, 1978, Ser. No. 899,950**
**Int. Cl.[2] B65D *85/72***
**U.S. Cl. 426—477** **29 Claims**




**1.** A method of carbonating an aqueous beverage at the point of consumption which comprises contacting a rigid composite body comprising crystalline zeolite molecular sieves in an amount of at least 40% of the body weight, said body having a surface area to mass ratio of from about 4 $cm^2/g.$ to about 200 $cm^2/g.$ and having at least 6 g. of crystalline zeolite molecular sieves distributed substantially uniformly throughout said body wherein said body has adsorbed therein a releasable amount of

carbon dioxide which is sufficient to carbonate said aqueous beverage when said body is immersed therein.

11. A beverage carbonation device comprising a rigid composite body of at least 40% by weight of crystalline zeolite molecular sieves, said body having a plurality of substantially parallel elongated channels extending from one surface of said body to an opposite surface with the longitudinal axis of said elongated channels substantially parallel to the axis of the vertical dimension of said body, said body having a surface to mass ratio of at least about 4 $cm^2/g.$, said body having adsorbed therein a releaseable amount of carbon dioxide which is sufficient to carbonate an aqueous beverage when said body is immersed therein, and said body being fixedly secured to the inner surface of a vessel top, said vessel being suitable for containing liquids.

---

**4,147,809**

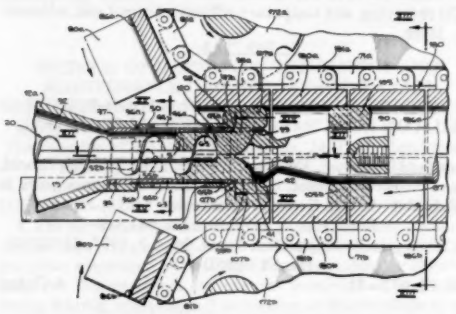
## METHOD AND APPARATUS FOR SIZING AND FORMING DOUGH BODIES

**Daniel T. Thompson, Pacific Palisades, Calif., assignor to Thompson Bagel Machine Mfg. Corporation, Los Angeles, Calif.**

**Continuation-in-part of Ser. No. 770,694, Feb. 22, 1977, abandoned. This application Nov. 14, 1977, Ser. No. 851,217**

**Int. Cl.[2] A21D *6/00*; A21C *11/00***

**U.S. Cl. 426—499** **14 Claims**



9. A method for converting an unformed quantity of dough into a plurality of uniformly sized and shaped dough bodies comprising the steps of:

(a) converting an unformed quantity of dough into at least one uniform ribbon of dough;

(b) engaging an end of said ribbon of dough in a forming zone moving relative to said ribbon;

(c) drawing said end of said ribbon of dough into said forming zone in an initial drawing operation;

(d) severing said end of said ribbon of dough into a dough piece within said forming zone after said initial drawing operation;

(e) moving said drawn severed dough piece completely into said forming zone;

(f) repeating steps (b) through (e) to form a plurality of dough pieces within said forming zone; and,

(g) manipulating said dough pieces in said forming zone to form a plurality of uniformly sized and shaped dough bodies.

---

**4,147,810**

## TREATMENT OF VEGETABLE PROTEIN

**Richard L. Kellor, Excelsior, Minn., assignor to Cargill, Incorporated, Minneapolis, Minn.**

**Continuation-in-part of Ser. No. 282,541, Aug. 21, 1972, abandoned. This application Oct. 29, 1974, Ser. No. 518,766**

**Int. Cl.[2] A23J *3/10***

**U.S. Cl. 426—629** **11 Claims**

1. A process for treating vegetable protein so as to improve the nutritive value thereof comprising providing a particulate, soy bean material dispersing an edible acid in said soy bean material to provide an acidified soy bean substrate having a pH of from about 1.0 to about 5.0, controlling the moisture in said acidified substrate at a level of from about 5 percent to about 35 percent by weight of said substrate so that said substrate remains particulate and heating said substrate to an elevated temperature of from about 250° F. to about 450° F. for a time sufficient to increase the free hexose level to above about 3.5 percent and to provide a PER above about 2.0.

---

**4,147,811**

## METHOD OF, AND APPARATUS FOR, MANUFACTURING COARSE-GRAINED BEAN CURD

**Masakatsu Abe, Nagoya, Japan, assignor to Tokyokikaikakogyo Kabushikikaisha, Japan**

**Filed Feb. 14, 1977, Ser. No. 768,526**

**Claims priority, application Japan, Feb. 17, 1976, 51-16795; Oct. 29, 1976, 51-130795; Dec. 13, 1976, 51-149641**

**Int. Cl.[2] A23L *1/20***

**U.S. Cl. 426—634** **6 Claims**

1. A method of manufacturing coarse-grained bean curd, comprising:

breaking a mass of coagulated soybean milk into lumps and supplying said lumps into a series of successively moving cups;

adding fluid soybean milk into each of said cups to effect bonding of said lumps by mixing said fluid soybean milk with residual coagulant solution, produced during said breaking, said amount of soybean milk added is just sufficient to be coagulated by said residual coagulant solution; and

heating said each cup with its contents at a temperature sufficient to coagulate the soybean milk and to effect bonding of said lumps to thereby form said lumps into a cake of bean curd.

---

**4,147,812**

## ELECTROPHORETIC DEVELOPMENT

**Noel J. De Volder, Edegem, and Yvan K. Gilliams, Hever, both of Belgium, assignors to AGFA-GEVAERT N.V., Mortsel, Belgium**

**Filed Sep. 14, 1976, Ser. No. 723,178**

**Claims priority, application United Kingdom, Sep. 16, 1975, 38068/75; Jan. 30, 1976, 3805/76**

**Int. Cl.[2] G03G *13/10, 9/12***

**U.S. Cl. 427—17** **10 Claims**

10. A method of reversal developing a negative electrostatic charge pattern on a surface, which method comprises contacting said surface with a liquid developer composition suitable for rendering visible in the reversed sense electrostatic charge patterns contained on a surface, which composition comprises a hydrocarbon liquid having a volume resistivity of at least $10^9$ Ohm.cm and a dielectric constant of less than 3, a negatively charged suspended toner comprising organic polymer-coated pigment particles and at least one organic ionic surfactant, wherein

(1) said organic ionic surfactant consists essentially of an oil-soluble overbased alkaline earth metal hydrocarbon sulphonate wherein the alkaline earth metal is magnesium, calcium or barium, the sulphonate has an average molecular weight of at least 800, and the total base number (TBN) of the surfactant determined according to ASTM D 664-58 is at least 2, and

(2) the polymeric material consists essentially of a copolymer of (A) a $C_{12}$–$C_{20}$ alkyl alcohol ester of methacrylic acid and (B) n-butyl or iosbutyl alcohol ester of methacrylic acid, in which the ratio by weight of (A)/(B) is in the range of 15 to 85/85 to 15; or a copolymer of said (A) and (B) and (C) styrene or a styrene homologue in which (C) is present up to a maximum of 70% by weight, said copolymer in either case containing up to 0.4% by weight of methacrylic acid units.

**4,147,813**

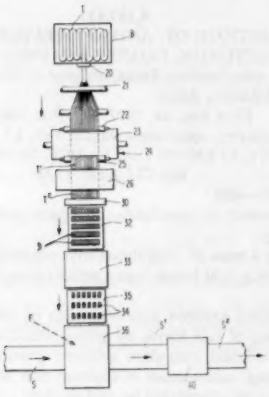
## METHOD OF MAKING A SPLINTER-FLOCKED FABRIC FROM A MULTIFILAMENT TOW

**James P. Casey, Seekonk, Mass., assignor to Microfibres, Inc., Pawtucket, R.I.**

**Continuation of Ser. No. 676,934, Apr. 14, 1976, abandoned, which is a continuation of Ser. No. 545,116, Jan. 25, 1975, abandoned. This application Jun. 9, 1977, Ser. No. 805,167**

**Int. Cl.[2] B05D** *1/04, 1/06;* **B05B** *1/00, 1/08*

**U.S. Cl. 427—27** **13 Claims**



1. In a method of making a splinter-flocked fabric, the steps which comprise:

(a) arranging a multifilament tow in the form of a wide, flat, thin ribbon, with the filaments of the tow closely adjacent and substantially parallel to intimately mixed individual filaments,

(b) temporarily adhering the filaments of said tow to each other while in the form of a wide, flat ribbon and while substantially parallel to each other by the application of a temporary adhesive,

(c) cutting the tow while in the form of a wide, flat thin ribbon into flock fibre lengths while said fibres are adhered and substantially parallel to each other, to form elongated flat, thin flock fibre bands, each said band comprising a plurality of substantially parallel cut fibres which are temporarily adhered by adhesive bands substantially parallel to each other in the form of elongated, flat fibre bands,

(d) controllably breaking up some of the adhesive bands of said bands to form said bands into a multiplicity of elongated, thin flat splinters of controlled denier, each said splinter comprising cut fibres temporarily adhered substantially parallel to each other, the number of fibres in each splinter being more than one but less than the number of fibres in the corresponding band,

(e) flocking said splinters by adhering them with an adhesive layer on a substrate, while maintaining said splinters as elongated thin flat structural units, controlling the rate of feed of said flock splinters with respect to the rate of feed of said substrate in a manner to space said splinters farther from each other than the spacing that exists between the individual fibres of the splinter, and

(f) removing said temporary adhesive but not said adhesive layer.

13. In a method of making a splinter-flocked fabric, the steps which comprise:

(a) arranging a multifilament tow in the form of a wide, flat, thin ribbon, with the filaments of the tow closely adjacent and substantially parallel to intimately mixed individual filaments,

(b) temporarily adhering the filaments of said tow to each other while in the form of a wide, flat ribbon and while substantially parallel to each other by the application of a temporary adhesive,

(c) drying said tow,

(d) cutting the dried tow while in the form of a wide, flat thin ribbon into flock fibre lengths while said fibres are adhered and substantially parallel to each other, to form elongated flat, thin flock fibre bands, each said band comprising a plurality of substantially parallel cut fibres which are temporarily adhered by adhesive bands substantially parallel to each other in the form of elongated, flat fibre bands,

(e) controllably breaking up some of the adhesive bands of said bonds to form said bands into a multiplicity of elongated, thin flat splinters of controlled denier, each said splinter comprising cut fibres temporarily adhered substantially parallel to each other, the number of fibres in each splinter being more than one but less than the number of fibres in the corresponding band,

(f) electrostatically flocking said splinters and maintaining the splinters as elongated units,

(g) adhering said splinters with an adhesive layer on a substrate, while maintaining said splinters as elongated thin flat structural units, controlling the rate of feed of said flock splinters with respect to the rate of feed of said substrate in a manner to space said splinters farther from each other than the spacing that exists between the individual fibres of the splinter, and

(h) removing said temporary adhesive but not said adhesive layer.

---

**4,147,814**

## METHOD OF MANUFACTURING HIGH-PURITY SILICON RODS HAVING A UNIFORM SECTIONAL SHAPE

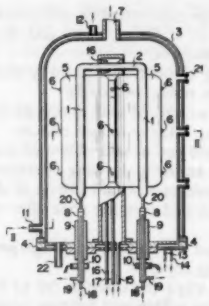
**Yoshifumi Yatsurugi, Fujisawa; Atsushi Yusa, Ninomiyamachi, and Nagao Takahashi, Hiratsuka, all of Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan**

**Filed Mar. 2, 1978, Ser. No. 882,819**

**Claims priority, application Japan, Mar. 3, 1977, 52/22212**

**Int. Cl.[2] B05D** *5/12*

**U.S. Cl. 472—51** **4 Claims**



1. A method of manufacturing high-purity silicon rods having a uniform sectional shape by subjecting a silicon compound to pyrolysis on a plurality of rod-shaped high-purity silicon carrier members which have been red-heated by directly passing an electric current therethrough thereby depositing high-purity silicon thereon, comprising the step of supplying monosilane into a pyrolysis container through multi-stage, upper and lower monosilane supply ports located in parallel with the axes of said silicon carrier members held vertically within the pyrolysis container while insulating the radiant heat between said red-heated carrier members by a thermal insulator along the overall length thereof, wherein the amount of supply of monosilane through the upper supply ports is increased as compared

with that through the lower supply ports in response to the increase of the diameter of each of said silicon rods.

---

4,147,815

## METHOD OF COATING THE INNER SURFACE OF A DISPLAY WINDOW OF A TELEVISION DISPLAY TUBE TO FORM A DISPLAY SCREEN

**Ekkehard Andrich, Hergenrath, and Klaus Schlageter, Aachen, both of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Sep. 7, 1977, Ser. No. 831,166**

**Claims priority, application Fed. Rep. of Germany, Sep. 17, 1976, 2641868**

**Int. Cl.[2] B05D** *1/40, 1/02*

**U.S. Cl. 427—64** **4 Claims**

1. In the manufacture of a display screen for a television display tube, the method of coating, with a liquid, a window panel of the display tube, said method comprising the steps of positioning the window panel to be coated above a vessel containing said liquid, positioning a brush having a central axis and radially extending brush hairs in said vessel at a position such that said axis is generally parallel to the surface of the liquid and the brush hairs on one side of said axis are at least partially immersed in said liquid, and rotating said brush about said axis at a rate sufficient to fling onto the window panel drops of liquid picked up by the brush hairs as they pass through the liquid.

---

4,147,816

## METHOD OF IMPROVING THE OUTPUT AND MAINTENANCE OF A FLUORESCENT LAMP

**Willy P. Schreurs, Danvers, Mass., assignor to GTE Sylvania Incorporated, Danvers, Mass.**

**Continuation of Ser. No. 634,959, Nov. 24, 1975, abandoned. This application Apr. 7, 1977, Ser. No. 785,463**

**Int. Cl.[2] B05D** *5/06, 7/22;* **H01J** *61/35*

**U.S. Cl. 427—67** **5 Claims**

1. The method of manufacturing a fluorescent lamp comprising the steps of: preparing a lead-activated barium mesosilicate phosphor suspension containing a heat decomposable chloride dissolved therein which can prevent formation of lead oxide during lehring; applying said suspension to the envelope of the lamp in order to deposit a phosphor coating thereon; and processing the phosphor coated envelope into a finished lamp including the step of lehring said phosphor coated envelope.

---

4,147,817

## PROCESS FOR INSULATING ELECTRICAL CONDUCTORS WITH HEAT-RESISTANT RESINS

**Harald Janssen, Stemwarde Siedlung, Fed. Rep. of Germany, assignor to Beck & Co. AG., Hamburg, Fed. Rep. of Germany**

**Continuation of Ser. No. 432,008, Jan. 8, 1974, abandoned, which is a continuation of Ser. No. 167,533, Jul. 29, 1971, abandoned. This application Jul. 6, 1976, Ser. No. 703,032**

**Claims priority, application Austria, Aug. 3, 1970, 267022/70**

**Int. Cl.[2] B05D** *1/18, 3/02*

**U.S. Cl. 427—118** **20 Claims**

1. A process for electrically insulating a wire electrical conductor with a heat resistant resin which comprises only once or twice applying a melt of the resin to the conductor at an operating temperature of at least 100° C. by passing the conductor through the melt to form a coating of the resin on the conductor, and baking the coating following each application for curing of the resin, said resin being a polyester imide curable through free hydroxy groups, having a cross-linking equivalent weight of 500–1500, produced by condensation at a temperature corresponding at least to the temperature of the melt to an extent that no substantial further condensation takes place in the melt, the equivalent ratio of hydroxyl groups to ester forming carboxyl groups in the reaction mixture corresponding to said polyesterimide being within the range of 1.15:1 to 1.65:1, the hardness of the insulation being at least 4H.

4,147,818

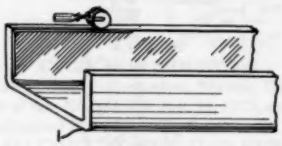
## PAPERBOARD TUBE CONCRETE FORMS

**Hodge Hatfield, Wood River, Ill., assignor to Alton Box Board Company, Alton, Ill.**

**Division of Ser. No. 726,845, Sep. 27, 1976, Pat. No. 4,083,526. This application Nov. 14, 1977, Ser. No. 851,163**

**Int. Cl.[2] B28B** *7/34, 7/38*

**U.S. Cl. 427—133** **2 Claims**



1. The method for processing a paperboard tube in preparation for its use in forming a concrete column comprising splitting a paperboard tube along its length into at least two parts, applying a coating of urethane resin to the split edges of the two parts to preclude paperboard delamination when exposed to moisture, then coating each tube part with an acrylic resin by dipping each part into such a solution to prevent moisture absorption therein, and then coating the interior surface of each tube part with a urethane resin coating to facilitate the tube release from a formed concrete column.

---

4,147,819

## METHOD FOR FORMING POLYPHENYLENE SULFIDE RESIN COATING ON THE SURFACE OF METAL SUBSTRATE

**Yorio Hukumoto, Kowachi Nagano; Hiroshi Kashiwadani, and Shuji Hiramatsu, both of Ohtsu, all of Japan, assignors to Sekisui Kagaku Kogyo Kabushiki Kaisha**

**Filed Mar. 16, 1977, Ser. No. 778,325**

**Claims priority, application Japan, Mar. 19, 1976, 51-30354**

**Int. Cl.[2] B05D** *3/02*

**U.S. Cl. 427—195** **4 Claims**

1. In a method for forming a coating of a polyphenylene sulfide on the surface of a metal substrate which comprises fusing a powder of polyphenylene sulfide to the surface of metal substrate and then curing the resin under heat, the improvement which comprises quenching the fused polyphenylene sulfide resin to solidify it, and then heat-curing the resin.

---

4,147,820

## DEPOSITION METHOD AND PRODUCTS

**Robert A. Holzl, La Canada, Calif., assignor to Chemetal Corporation, Pacoima, Calif.**

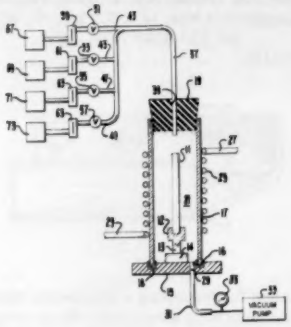
**Continuation of Ser. No. 702,435, Jul. 6, 1976, abandoned, which is a continuation-in-part of Ser. No. 588,391, Jun. 19, 1975, abandoned, which is a continuation-in-part of Ser. No. 358,110, May 7, 1973, abandoned. This application Nov. 7, 1977, Ser. No. 849,035**

**Int. Cl.[2] C23C** *11/00, 13/00*

**U.S. Cl. 427—248 C** **8 Claims**

1. A method for producing a hard deposit on a substrate, comprising, providing a gaseous volatile halide or tungsten or molybdenum, reacting said volatile halide at less than atmospheric pressure spaced from the surface of the substrate in the presence of gaseous carbon monoxide and water vapor to form a first intermediate compound of tungsten and molybdenum spaced from the surface of the substrate, reacting said first intermediate compound at less than atmospheric pressure in the presence of gaseous hydrogen and gaseous carbon monoxide and water vapor to cause the deposition on the substrate of a second intermediate compound of tungsten or molybdenum which is in a liquid phase, the ratio of gram atoms of carbon to gram atoms of the tungsten or molybdenum in the gas stream

being less than or equal to unity and greater than 0.03 to 1, the ratio of gram atoms of carbon to gram atoms of oxygen in the gas stream being equal to or less than 3 to b 1, and reacting the liquid phase second intermediate compound on the surface of



the substrate to produce a hard deposit containing essentially tungsten or molybdenum and carbon, said deposit having a hardness of greater than 1000 VHN with a modulus of rupture in bending of greater than 200 kg/mm$^2$.

---

**4,147,821**

## IMPREGNATION OF POROUS ARTICLES

**Peter D. Young, St. Andrews, Channel Islands, assignor to Ultraseal International Limited, Guernsey, Channel Islands**

**Filed Apr. 26, 1977, Ser. No. 790,912**

**Claims priority, application United Kingdom, Aug. 17, 1976, 6217/76**

**Int. Cl.**[2] **B08B** *7/00;* **C23D** *17/00;* **B05D** *3/00*

**U.S. Cl. 427—295** **19 Claims**

1. A method of impregnating porous rigid articles which comprises causing the pores to be filled with an impregnant comprising a liquid which comprises 60–98% wt. of (meth)acrylic monomer and 2–40% wt. of polyfunctional monomer, 0.1–5% wt. of free radical catalyst and 0.01–2% wt. of inhibitor for said catalyst, said inhibitor and catalyst being selected such that curing can be effected in hot water at a temperature of at least 90° C within 3 to 15 minutes, washing the article with water or with water and an emulsifier if an emulsifier is not present in the impregnant to remove excess impregnant from the surfaces of the article and curing the impregnant by heating the article in hot water to a temperature of not greater than 100° C.

---

**4,147,822**

## COMPOSITE STRUCTURE AND PROCESS AND APPARATUS FOR MAKING THE SAME

**Albert W. Kallmeyer, Crestwood, and Harry A. Holman, Jr., Ladue, both of Mo., assignors to McDonnell Douglas Corporation, St. Louis, Mo.**

**Filed Jun. 24, 1976, Ser. No. 699,473**

**Int. Cl.**[2] **B32B** *5/12, 3/28;* **B05D** *3/02;* **D03D** *3/02*

**U.S. Cl. 428—35** **12 Claims**

1. A composite structure comprising: a plurality of longitudinal strands arranged one after the other in two directions so as to provide an array having depth, some of the longitudinal strands being interrupted so as to form a void in the array; a cross strand woven through the interrupted as well as the uninterrupted longitudinal strands, whereby the weave so formed possess greater thickness where the interrupted strands exist; and a resin matrix rigidifying the weave.

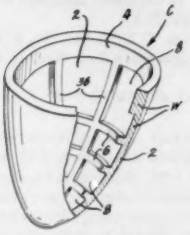
9. A process for producing a composite structure, said process comprising:

(1) positioning longitudinal strands along a base mandrel such that the strands are built up on each other with some strands being closer to the base mandrel than others;

(2) forming a weave along the base mandrel by weaving cross stands through the longitudinal strands;

(3) installing a submandrel along the base mandrel such that some of the longitudinal strands pass in back of the submandrel and others pass in front of the submandrel;

(4) forming more weave along the submandrel by weaving cross strands through only the longitudinal strands located in front of the submandrel;



(5) impregnating the weave with a rigidifying substance while the weave is still along the base mandrel and submandrel;

(6) separating the weave from the base mandrel;

(7) severing the longitudinal strands located behind the submandrel; and

(8) thereafter removing the submandrel from the weave.

---

**4,147,823**

## LAMP GLASS ENVELOPE CONTAINING MARKING THEREON

**Francois A. Lavallee, Cleveland Heights, Ohio, assignor to General Electric Company, Schenectady, N.Y.**

**Continuation-in-part of Ser. No. 555,832, Mar. 6, 1975, abandoned, and a continuation-in-part of Ser. No. 354,676, Apr. 26, 1973, abandoned. This application Jun. 17, 1977, Ser. No. 807,581**

**Int. Cl.**[2] **B65D** *1/00;* **B05D** *5/12;* **C03C** *17/26;* **H01K** *1/32*

**U.S. Cl. 428—35** **1 Claim**

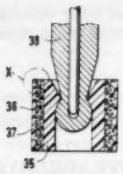
1. An electrical lamp having a lamp glass envelope upon which a marking ink has been adhesively bonded to the glass envelope so that the underlying glass substrate has been etched, said marking ink being the heat cured product of a mixture of an aluminum salt of a weak organic acid containing at least five carbon atoms with a phosphoric acid selected from the group of ortho-phosphoric acid and mixtures of orthophosphoric acid with meta-phosphoric acid wherein the weight ratio of phosphoric acid is maintained from a weight ratio for conversion of the aluminum salt to $AlPO_4$ up to an excess weight ratio of about 2.5 to 1 and which mixture further contains an inorganic filler and inorganic color pigment wherein said inorganic filler and inorganic color pigment are bonded together and to the glass substrate with an insoluble vitreous $AlPO_4$ cement, said heat cured product having been obtained by depositing a liquid dispersion of the aluminum salt, phosphoric acid, inorganic filler and color pigment constituents upon the glass substrate and heating said liquid dispersion to a temperature of approximately 300° C for a sufficient time period to form said heat reaction product.

4,147,824

## MULTILAYER SEALS AND METHOD FOR THEIR PRODUCTION AND JOINING TO SEAL CARRIERS

Heinrich Dettmann, and Ernst Uhl, both of Ingelfingen, Fed. Rep. of Germany, assignors to Bürkert GmbH, Ingelfingen, Fed. Rep. of Germany

Filed Mar. 31, 1977, Ser. No. 783,513
Claims priority, application Fed. Rep. of Germany, Mar. 31, 1976, 2613658; Mar. 11, 1977, 2710614
Int. Cl.[2] B32B 3/02
U.S. Cl. 428—65 6 Claims




1. A circular, multi-layer seal for closing valve seals of valves handling aggressive media, said seal being held by a valve seat seal carrier, comprising:
- a base layer of PTFE material provided with a plurality of internal voids which impart to it a rubber-like elasticity; and
- a foil-like smooth, tight surface layer of PTFE material disposed on said base layer and constituting the sealing surface of said seal.

6. A movable valve seat seal carrier member for use in a valve carrying chemically aggressive substances, said valve seat seal carrying member being provided with a seal as defined by claim 1, said base layer being porous only in an annular region, remaining portions of said base layer being made from non-porous homogeneous PTFE, and said seal being attached to said valve seat seal carrier member by a central screw penetrating said seal and entering said valve seat seal carrier member.

---

4,147,825

## POLYMERIC FOAM CUSHIONING ARTICLE AND METHOD FOR MAKING THE SAME

Anselm Talalay, 2867 Ludlow Rd., Cleveland, Ohio 44120

Continuation-in-part of Ser. No. 613,612, Sep. 15, 1975, abandoned. This application Aug. 22, 1977, Ser. No. 826,828
Int. Cl.[2] B32B 3/10; A47G 9/00
U.S. Cl. 418—138 6 Claims

1. A cushioning article having an improved balance of physical characteristics including good comfort and support properties, good air permeability, reduced "fight back" and relative freedom from dynamic fatigue made from polymeric foam materials comprising,
- a resilient body of multi-layered construction,
- said body including, in combination, conventional and high resiliency foam materials with said high resiliency foam material disposed interiorly of the outermost layer of said body,
- the outermost of said layers including a plurality of generally symmetrically spaced apertures having a diameter in the range from $\frac{1}{8}$" to $\frac{1}{4}$",
- said layers being reduced in a width-wise dimension in a direction toward the interior of said body, and
- the adjacent outer layers of said body being secured to one another along their associated peripheries to form a stereo-elliptical shape for said article.

---

4,147,826

## SNAKE SKIN MOUNTING

Donald J. Kaleta, 5020 Bellemeadow, Mentor, Ohio 44060

Continuation of Ser. No. 763,859, Jan. 31, 1977, abandoned. This application Mar. 30, 1978, Ser. No. 891,753
Int. Cl.[2] C14B 17/00; C14C 15/00; B32B 9/02
U.S. Cl. 428—151 12 Claims

1. A method of mounting a shed snake skin comprising, the steps of:
- causing a shed snake skin to be disposed on an adhesive free substrate with the skin being in a saturated condition,
- and with the interior of the shed snake skin being free of adhesive and facing the substrate with at least a film of adhesive free liquid disposed between the shed snake skin and the substrate,
- removing excess liquid by applying a rolling pressure to the exterior of the skin, and
- causing the shed snake skin to dry whereby at least portions of the skin and substrate adhere to each other to form a unitary product.

10. A mounted shed snake skin, wherein
- the interior of a shed snake skin is disposed in contact with a substrate and wherein,
- said snake skin was mounted by the steps of:
- causing a shed snake skin to be disposed on an adhesive free substrate with the skin being in a saturated condition and with the interior of the shed snake skin being free of adhesive and facing the substrate with at least a film of adhesive free liquid disposed between the shed snake skin and the substrate.
- removing excess liquid by applying a rolling pressure to the exterior of the skin, and
- causing the shed snake skin to dry whereby at least portions of the skin and substrate adhere to each other to form a unitary product.

---

4,147,827

## COEXTRUDED HEAT SEALABLE LAMINAR THERMOPLASTIC FILMS

Peter Breidt, Jr., Webster; Thomas W. Higgins, Penfield; A. Michael Nahmias, Canandaigua, and Milton L. Weiner, Rochester, all of N.Y., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Nov. 4, 1977, Ser. No. 848,435
Int. Cl.[2] B32B 27/32, 27/08
U.S. Cl. 428—218 2 Claims

1. A heat sealable, biaxially oriented, coextruded thermoplastic film laminate comprising a core layer, at least one surface of the core layer having laminated thereto a skin layer, said core layer comprising a member selected from the group consisting of (1) ethylene/propylene copolymers; (2) blends of ethylene/propylene copolymer with an aliphatic diene copolymer; and (3) blends of polypropylene homopolymer with an aliphatic diene copolymer, said skin layers comprising an ethylene based polymer having a density of from about 0.910 to about 0.939 and a melt index of from about 0.3 up to about 20.0 and an ethylene content of at least about 80 percent; said laminate being further characterized wherein said core layer has a relatively higher melting point than said skin layer.

## 4,147,828
## TUMBLING AND EXERCISE MAT

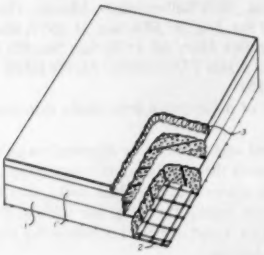
**Klaus Heckel, Weinheim an der Bergstrasse; Friedemann Klaffke, Gorxheimertal, and Walter Umann, Weinheim an der Bergstrasse, all of Fed. Rep. of Germany, assignors to Firma Carl Freudenberg, Weinheim an der Bergstrasse, Fed. Rep. of Germany**

**Filed Jul. 8, 1977, Ser. No. 813,996**

**Claims priority, application Fed. Rep. of Germany, Jul. 10, 1976, 7621838[U]**

**Int. Cl.[2] B32B** *3/26*

**U.S. Cl. 428—255** **3 Claims**



1. A lightweight exercise and tumbling mat comprising a core comprising a plurality of layers laminated together, each layer composed of a closed-cell foamed synthetic material with soft elastic properties, wherein the plurality of layers have a progressively greater density towards the underside, at least one of a textile sheeting and a film on the surface corresponding to the top and a nonskid sheeting comprising an open mesh netting of rubber or synthetic material on the underside of the core.

---

## 4,147,829
## LAMINATED MATERIAL

**Brian C. Holland, Chorley, England, assignor to Strewtex Fabrics Limited, Lancashire, England**

**Continuation-in-part of Ser. No. 727,342, Sep. 28, 1976, abandoned. This application Jun. 1, 1978, Ser. No. 911,690**

**Int. Cl.[2] B32B** *3/26*

**U.S. Cl. 428—311** **10 Claims**

1. A laminated clothing material comprising a layer of foamed polyurethane, said layer being from 2 to 6 mm thick and having a first inner face and a second outer face, a heat reflective layer flame bonded to said first face and a layer of weatherproof fabric flame bonded to said second face; said heat reflective layer comprising a flexible plastics support layer and a layer of metal deposited on one side thereof.

4. A laminated clothing material as claimed in claim 1, wherein the foam has open cells.

---

## 4,147,830
## RECORDING SHEET

**Hajime Kato; Akira Igarashi; Hiroharu Matsukawa, and Akio Miyamoto, all of Fujimiya, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan**

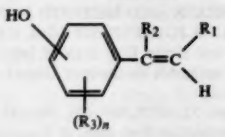
**Filed Jan. 21, 1977, Ser. No. 761,030**

**Claims priority, application Japan, Jan. 28, 1976, 51-8229; Feb. 3, 1976, 51-10544; Feb. 5, 1976, 51-11729; Feb. 9, 1976, 51-12935**

**Int. Cl.[2] B32B** *5/16, 19/00*

**U.S. Cl. 428—324** **14 Claims**

1. A recording sheet comprising a support having thereon a layer of a color developer capable of forming a developed color image in the presence of a color former wherein said layer of said color developer contains (1) a dimer of a compound of the formula (I):



(I)

wherein $R_1$, $R_2$ and $R_3$, which may be the same or different, each represents a hydrogen atom, an alkyl group, an aryl group or an aralkyl group, and n is an integer of 1 to 4, as a color developer; and (2) an oil adsorptive inorganic pigment, wherein said layer of said color developer further contains at least one of a phenol resin and a metal salt of an aromatic carboxylic acid.

---

## 4,147,831
## PRESSURE-SENSITIVE ADHESIVE COMPOSITIONS

**Ivan J. Balinth, Cranford, N.J., assignor to Johnson & Johnson, New Brunswick, N.J.**

**Filed Aug. 31, 1977, Ser. No. 829,376**

**Int. Cl.[2] C09J** *3/12, 3/14;* **A61L** *15/06*

**U.S. Cl. 428—356** **6 Claims**

1. A pressure-sensitive adhesive composition comprising from about 30% to about 50% by weight of the total composition of an elastomeric mixture consisting of natural rubber and polyisobutylene wherein the polyisobutylene has a molecular weight range of from about 64,000 to about 99,000, from about 5% to about 20% by weight of the total composition of a liquid plasticizer component, and from about 30% to about 50% by weight of the total composition of a solid tackifier component having a softening point of from about 100° C. to about 125° C., wherein the elastomeric mixture of natural rubber and polyisobutylene is in a ratio of from about 1:1 to about 3:1 and the composition has a Williams plasticity of from about 1.5mm to about 2.4mm.

6. A surgical pressure-sensitive adhesive product comprising a flexible backing having a pressure-sensitive adhesive composition coated on at least one side thereof, said pressure-sensitive adhesive composition comprising from about 30% to about 50% of an elastomeric mixture consisting of natural rubber and polyisobutylene wherein the polyisobutylene has a molecular weight range of from about 64,000 to about 99,000, from about 5% to about 20% by weighting of the total composition of a liquid plasticizer component, and from about 30% to about 50% by weight of the total composition of a solid tackifier component having a softening point of from about 100° C. to about 125° C., wherein the elastomeric mixture of natural rubber and polyisobutylene is in a ratio of from about 1:1 to about 3:1 and the pressure-sensitive adhesive composition has a Williams plasticity of from about 1.5 mm to about 2.4 mm.

---

## 4,147,832
## FIXING ROLLER

**Ryoichi Namiki, Hino, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan**

**Filed Sep. 12, 1977, Ser. No. 832,607**

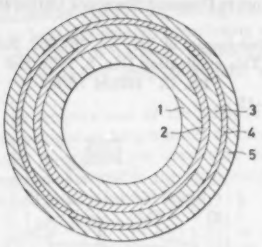
**Claims priority, application Japan, Sep. 22, 1976, 51-114072**

**Int. Cl.[2] B32B** *15/06, 25/20*

**U.S. Cl. 428—375** **3 Claims**

1. A fixing roller comprising a core, and progressing outwardly from said core, a first layer which is a heat resistant adhesive layer, a second layer which is a heat and oil resistant elastic layer, a third layer which is a heat and oil resistant adhesive layer, and a fourth layer which is an offset preventing layer, wherein said fourth layer comprises a room temperature

vulcanized silicone rubber, and said third layer comprises a fluorine base silicone rubber, and said second layer comprises




a rubber selected from the group consisting of silicone fluoride rubber and fluorine-containing rubber.

---

**4,147,833**

## GLASS FIBER COATING COMPOSITION

**George E. Eilerman, and Albert E. Tamosauskas, both of Pittsburgh, Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.**

**Division of Ser. No. 801,171, May 27, 1977, Pat. No. 4,074,988, which is a continuation of Ser. No. 637,341, Dec. 3, 1975, abandoned, which is a continuation of Ser. No. 512,648, Oct. 7, 1974, abandoned, which is a continuation-in-part of Ser. No. 348,876, Aug. 2, 1973, abandoned. This application Nov. 16, 1977, Ser. No. 852,116**

**Int. Cl.[2] C08L *7/00***

**U.S. Cl. 428—378** **5 Claims**

1. A composition for coating glass fibers for use in reinforcing elastomeric materials consisting essentially of:

a. water and ammonium hydroxide: 60 to 85 percent by weight;

b. an elastomeric latex: 20 to 70 percent by weight;

c. a condensation reaction product of

i. a polycarboxylic acid;

ii. an anhydride;

iii. a polyanhydride; or

iv. a tricarboxylic monoanhydride and

a polyfunctional amine: 3 to 15 percent by weight; said reaction product being soluble is aqueous ammonia.

---

**4,147,834**

## FLUORINATED POLYMER COATED CARRIER PARTICLES

**Howard E. Munzel, and Carl A. Queener, both of Lexington, Ky., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Division of Ser. No. 596,022, Jul. 11, 1975, abandoned, which is a division of Ser. No. 472,335, May 22, 1974, Pat. No. 3,947,271, which is a continuation of Ser. No. 226,015, Feb. 14, 1972, abandoned. This application Dec. 14, 1976, Ser. No. 750,997**

**The portion of the term of this patent subsequent to Mar. 30, 1993, has been disclaimed.**

**Int. Cl.[2] G03G *9/02, 13/08***

**U.S. Cl. 428—407** **3 Claims**

1. A long lasting triboelectrically negative carrier for use in a developer mixture of an electrophotographic process using electroscopic fusible toner particles smaller than said carrier having electrode or magnetic brush development consisting essentialy of:

a ferromagnetic, electrically conductive core having a size of from 50 to 600 microns;

a continuous thin coating of fully fluorine saturated hydrocarbon solid polymer in uniform thickness up to 10 microns on said core, said coating providing triboelectric charge for the toner particles and which coating is strongly resistant to fused on toner filming, whereby the toner particles will adhere to the carrier by virtue of said negative triboelectric charge.

---

**4,147,835**

## ARTICLE HAVING SELF-CLEANING COATING

**Atsushi Nishino, Neyagawa; Kazunori Sonetaka; Kunio Kimura, both of Hirakata, and Nasaki Ikeda, Moriguchi, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Apr. 18, 1977, Ser. No. 788,582**

**Claims priority, application Japan, Apr. 20, 1976, 51-45089**

**Int. Cl.[2] B32B *9/04, 9/06, 15/04;* A21B *1/00***

**U.S. Cl. 428—450** **12 Claims**

1. An article having a self-cleaning coating comprising a substrate having fused thereon a frit consisting essentially of 15 to 60% by weight of $SiO_2$, 9 to 35% by weight of $B_2O_3$, 10 to 30% by weight of $Na_2O$, 1 to 25% by weight of $Al_2O_3$, 0 to 25% by weight of $TiO_2$ and at least two ingredients selected from the group consisting of 0 to 20% by weight of $Li_2O$, 0 to 10% by weight of $K_2O$, and 0 to 10% by weight of CaO; and an oxidizing catalyst selected from the group consisting of the oxides of Mn, Cu, Ni, Co, Sn, V and Mo.

---

**4,147,836**

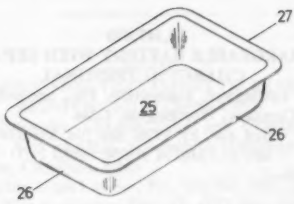
## POLYESTER COATED PAPERBOARD FOR FORMING FOOD CONTAINERS AND PROCESS FOR PRODUCING THE SAME

**Scott W. Middleton; Lee J. Murray, Jr., both of Appleton, Wis., and Steven R. Felstein, Redondo Beach, Calif., assignors to American Can Company, Greenwich, Conn.**

**Filed Mar. 28, 1978, Ser. No. 891,053**

**Int. Cl.[2] B32B *27/10;* B29C *19/04;* B05D *3/06***

**U.S. Cl. 428—481** **12 Claims**




1. A process for producing coated paperboard material suitable for forming pressed heatable food trays, comprising the steps of:

(a) passing a web of paperboard material through a corona discharge device at a corona energy density level sufficient to subject the paperboard to an energy density of at least 0.35 joules per square inch of paperboard surface;

(b) passing the corona treated paperboard into a nip formed between a chill roll and a backup roll while simultaneously passing a hot melt extrusion of polyethylene terephthalate into the nip between the corona treated side of the paperboard and the chill roll, the hot melt extrusion exiting from the extrusion die at an initial temperature of between 580° F. and 640° F. through an air gap before insertion into the nip, the air gap distance being selected with respect to the speed of the paperboard and the ambient and chill roll temperatures such that the temperature

of the extrusion at the time of contact with said paperboard is above its melting temperature and such that it is chilled below its glass transition temperature at the time that it leaves the chill roll to thereby facilitate separation therefrom.

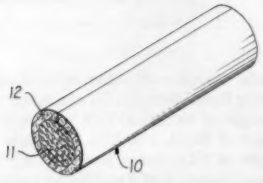
---

**4,147,837**

## ELONGATE COMPOSITE ARTICLE

**John R. Nieman, Pekin, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.**

**Filed Dec. 12, 1977, Ser. No. 859,495**
**Int. Cl.[2] B22F 3/00**
**U.S. Cl. 428—548** **10 Claims**




1. An elongate composite article for controlled insertion into molten iron for altering same, said molten iron having a preselected temperature, comprising:

a core of particulate treating agent in a compacted condition; and

a tubular sheath enclosing said core and maintaining said core in said compacted condition, said sheath being a sintered metal and wherein the sintered metal contains iron, carbon, silicon and phosphorous in amounts substantially matching the composition of cast iron.

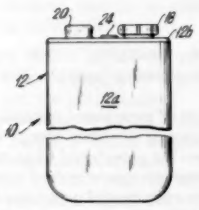
---

**4,147,838**

## RECHARGEABLE BATTERY WITH SEPARATE CHARGING TERMINAL

**Edward A. Leffingwell, Gainesville, Fla., assignor to General Electric Company, Worthington, Ohio**

**Filed Apr. 13, 1978, Ser. No. 896,039**
**Int. Cl.[2] H01M 10/04; H02J 7/00**
**U.S. Cl. 429—1** **14 Claims**



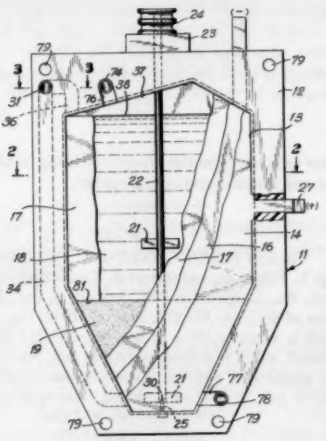

1. In a rechargeable battery having first and second power terminal contacts wherein the improvement comprises a charging terminal contact spaced from said power terminal contacts and in electrical contact with one of said power terminal contacts, whereby said charging terminal and the other of said power terminals form the charging circuit terminals for the battery.

**4,147,839**

## ELECTROCHEMICAL CELL WITH STIRRED SLURRY

**Frank Solomon, Great Neck, N.Y., and Charles Grun, Matawan, N.J., assignors to Diamond Shamrock Corporation, Cleveland, Ohio**

**Continuation-in-part of Ser. No. 707,462, Jul. 21, 1976, abandoned. This application Dec. 8, 1977, Ser. No. 858,877**
**Int. Cl.[2] H01M 12/06**
**U.S. Cl. 429—15** **12 Claims**




1. An intermittently, hydraulically refuelable battery system comprising a plurality of substantially vertical cell units, each said cell unit containing positive gas electrodes in working relationship with a negative, fluidized bed electrode located in an electrolyte chamber;

said electrolyte chamber being substantially vertically arranged and consisting of an upper and lower portion and having therein electrolyte and active metal powder;

said upper portion consisting of two spaced apart, substantially parallel sidewalls, at least one of said sidewalls made up of an outer battery separator and a substantially contiguous inner negative collector, the remaining portions of said electrolyte chamber along with said sidewalls form a substantially, completely enclosed electrolyte chamber;

said chamber having means to charge fresh electrolyte and active metal powder as well as means to discharge spent electrolyte and spent metal powder when said battery system is dormant;

stirring means located within said electrolyte chamber to maintain said active metal powder fluidized so that said metal powder randomly contacts said negative collector during discharge of said battery system becoming part of the electrode, said active metal powder filling only the lower portion of the electrolyte chamber when said battery is fully charged and said metal powder is not fluidized and the total volume of the electrolyte chamber is such to contain a sufficient amount of electrolyte to dissolve all of the soluble reaction products formed during discharge of the battery.

---

**4,147,840**

## HALOGEN COMPLEXING HOMOTETRA-ALKYL SALTS FOR USE IN HALOGEN CELLS

**Fraser M. Walsh, Arlington; Dennis N. Crouse, Melrose, and Alfred M. Ajami, Boston, all of Mass., assignors to Eco-Control, Inc., Cambridge, Mass.**

**Filed Mar. 24, 1978, Ser. No. 889,888**
**Int. Cl.[2] H01M 10/36**
**U.S. Cl. 429—50** **8 Claims**

1. A process for improving the performance of current

delivering electrochemical systems of the type which utilize a substance selected from the group consisting of bromine, chlorine, iodine, and mixtures thereof as their electrochemically active agent, said process comprising: adding to the electrolyte of said system, at least one halogen complexing additive, said additive being selected from the group consisting of homotetra-alkyl ($C_1$–$C_7$) quaternary ammonium salts and a halide counterion; and,

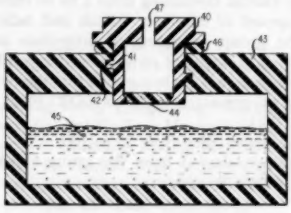
maintaining the temperatures of the additive when complexed with halogen at temperatures in excess of 30° C. and sufficient to prevent the complexed additive from crystallizing and thus enable the complexed additive to exist in the cell as an insoluble liquid.

---

## 4,147,841
## VENTED CONTAINER

**Jayant R. Shroff, Morris Township, Morris County, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Dec. 27, 1977, Ser. No. 864,329**
**Int. Cl.² H01M 2/12**
**U.S. Cl. 429—86** **3 Claims**

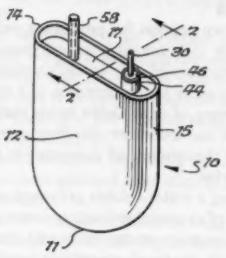



1. A vented container for a liquid, comprising a vessel with at least one aperture, a quantity of acidic aqueous solution within the vessel, and closure devices for sealing each said aperture against passage of the solution, at least one closure device including a body of a first material with a free surface on the liquid facing side thereof, said first material including venting passages extending from the interior of the vessel to the exterior of the vessel, wherein the first material is not wettable by the solution and the body includes venting passages from 10 to 200 micrometers wide with no such passage greater than 200 micrometers in width at its narrowest portion, whereby the container is effectively closed to solution spillage while permitting venting of a gas; which said at least one closure device includes engaging means for sealably engaging the vessel, which said engaging means includes an engaging member of a second material, which said engaging member includes a shell of the second material, which shell possesses no significant porosity, which said engaging means further includes a gasket consisting essentially of a cross linked ethylene propylene diene terpolymer.

## 4,147,842
## LITHIUM-BROMINE CELL

**Curtis F. Holmes, and Max A. Mueller, both of E. Amherst, N.Y., assignors to Eleanor & Wilson Greatbatch Foundation, Akron, N.Y.**

**Filed Jun. 14, 1978, Ser. No. 915,518**
**Int. Cl.² H01M 6/24**
**U.S. Cl. 429—101** **6 Claims**




1. A lithium-bromine cell comprising a lithium anode, a solid electrolyte comprising lithium bromide and a bromine cathode comprising pyridine bromide per bromide.

---

## 4,147,843
## ACID MIXTURE FOR THE ELECTROLYTE OF A GALVANIC BATTERY, AND A METHOD FOR PRODUCING SAID MIXTURE

**Allan K. Häkkinen, Vantaa, Finland, assignor to Oy Airam AB, Helsinki, Finland**

**Filed Oct. 19, 1977, Ser. No. 843,697**
**Int. Cl.² H01M 4/36**
**U.S. Cl. 429—109** **9 Claims**

1. An electrolyte precursor composition for use in a galvanic battery in which the electrolyte flows as a liquid solution, said composition comprising a paste-like mixture of concentrated sulphuric acid and powdered chromic acid.

---

## 4,147,844
## REVERSE-SIDE TREATMENT OF FABRIC REINFORCED MEMBRANES

**Andrew D. Babinsky, Chagrin Falls, and Charles J. Hora, Painesville, both of Ohio, assignors to Diamond Shamrock Corporation, Cleveland, Ohio**

**Continuation-in-part of Ser. No. 746,789, Dec. 2, 1976, abandoned. This application Dec. 27, 1977, Ser. No. 864,200**
**Int. Cl.² C08J 5/22, 7/12**
**U.S. Cl. 521—27** **7 Claims**

1. A process for the preparation of a fabric reinforced ion exchange membrane which comprises heating a fluorinated polymeric material containing pendant side chains containing sulfonyl groups, said sulfonyl groups being attached to carbon atoms which have at least one fluorine atom attached thereto, to a temperature resulting in sufficient melt flow of said polymer to permit laminating of an open mesh reinforcing fabric thereto; applying an open mesh reinforcing fabric to one surface of said heated fluorinated polymer with sufficient pressure to cause a melt flow of said polymer to at least partially through said fabric to form a laminate, and thereafter treating said one surface of said fluorinated polymer with an aminating compound selected from the group consisting of primary amines, secondary amines and mixtures thereof so that a majority of the sulfonyl on said first surface are converted to the $—SO_2N—$ form to a depth of at least 10 microns.

4,147,845

## REDUCING THE MONOMER CONTENT IN EXPANDABLE THERMOPLASTIC BEADS

Jorgen Petersen, Sundsvall, Sweden, assignor to Kemanobel AB, Stockholm, Sweden

Continuation-in-part of Ser. No. 858,122, Dec. 6, 1977, Pat. No. 4,105,596. This application Jul. 25, 1978, Ser. No. 927,778
Claims priority, application Sweden, Jun. 8, 1978, 7806665
Int. Cl.[2] C08J 9/20
U.S. Cl. 521—56 10 Claims

1. In the known process for producing expandable thermoplastic beads by polymerizing an ethylenically unsaturated monomer or a mixture of ethylenically unsaturated monomers in aqueous suspension in the presence of a blowing agent and recovering a slurry of expandable beads that contain undesirable amounts of the monomer, the improvement which comprises reducing the amount of monomer in said slurry of expandable beads by

(1) introducing a water-soluble polymerization initiator into said slurry of expandable beads to cause polymerization of residual monomers contained in said slurry.

(2) heating said slurry of expandable beads and said water-soluble polymerization initiator to a temperature above 65° C. in a vessel that is maintained completely full of liquid media so to leave no space for the accumulation of gas in the vessel, and

(3) continuing said heating until the desired reduction in monomer content in said slurry of expandable beads is achieved.

---

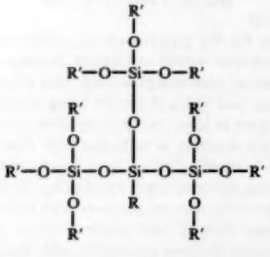
4,147,846

## ALKOXYSILANE CLUSTER SURFACTANTS FOR RIGID POLYURETHANE FOAM

Stephen L. Goldstein, and David F. Gavin, both of Cheshire, Conn., assignors to Olin Corporation, New Haven, Conn.

Filed Aug. 17, 1978, Ser. No. 934,644
Int. Cl.[2] C08G 18/14
U.S. Cl. 521—110 26 Claims

1. In a process for producing a rigid polyurethane foam from a reaction formulation comprising a polyol, an organic polyisocyanate, a foaming agent and a catalyst, the improvement characterized by adding an effective proportion of a surfactant composition having the formula:



wherein R is hydrogen, an alkyl, alkenyl, aryl or aralkyl, and each R′ is independently selected from the same group as R, with the proviso that at least a majority of R′ radicals on each Si atom are sterically hindered alkyl groups having at least 3 carbon atoms.

4,147,847

## METHOD OF PREPARING FLEXIBLE FLAME RETARDANT POLYETHER BASED ONE-SHOT POLYURETHANE FOAMS AND COMPOSITIONS THEREFORE

Carl W. Schweiger, Coleman, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Filed Nov. 14, 1973, Ser. No. 415,607
Int. Cl.[2] C08J 9/00
U.S. Cl. 521—112 13 Claims

1. A method of preparing a flexiable one-shot polyether based polyurethane foam which method includes the steps of

(I) preparing a homogeneous mixture consisting essentially of

(a) 100 parts by weight of a polyether containing at least two hydroxyl groups,

(b) a sufficient amount of organic polyisocyanate to give from 90–120 percent, on a stoichiometric basis, of isocyanate radicals for each hydroxyl radical in the composition,

(c) a catalytic amount of a catalyst for the production of the polyurethane foam,

(d) 1–10 parts by weight of a blowing agent,

(e) 3.5 to 7.9 parts by weight of a flame retardant, and,

(f) a foam stabilizing amount of a siloxane-oxyalkylene copolymer selected from the group consisting of copolymers having the average structural formulae

$$R_aSi\,[(OSiMe_2)_n(OSiMeG)_dOSiMe_2G]_{4-a}, \quad \text{(i)}$$

$$GMe_2Si(OSiMe_2)_n(OSiMeG)_bOSiMe_2G, \quad \text{(ii)}$$

$$Me_3Si(OSiMe_2)_n(OSiMeG)_cOSiMe_3, \quad \text{(iii)}$$

$$R_aSi\,[(OSiMe_2)_n(OSiMeG)_cOSiMe_3]_{4-a} \quad \text{(iv)}$$

or mixtures thereof, in which formulae R is a hydrocarbon radical free of aliphatic unsaturation and contains from 1 to 10 carbon atoms,

Me is a methyl radical,

G is a radical of the structure $-D(OR'')_mA$ wherein D is an alkylene radical containing from 1 to 30 carbon atoms,

R″ is composed of ethylene radicals and radicals selected from the group consisting of propylene and butylene radicals, the amount of ethylene radicals relative to the other alkylene radicals being such that the ratio of carbon atoms to oxygen atoms in the total OR″ block ranges from 2.3:1 to 2.8:1,

m has an average value from 25 to 100,

A is a radical selected from the group consisting of the —OR′, —OOCR′ and

radicals wherein R′ is a radical free of aliphatic unsaturation selected from the group consisting of hydrocarbon and hydrocarbonoxy radicals, the A radical containing a total of less than eleven atoms,

a has an average value from 0–1,

n has an average value from 6–420,

d has an average value from 0–30,

b has an average value from 1–30, and

c has an average value from 3–30 to the extent that the ratio of total $Me_2SiO$ units to total

units is within the range of 3.5:1 to 15:1,

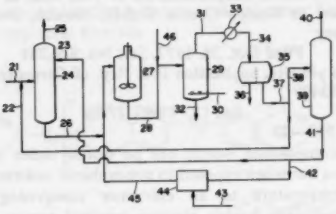
(II) thereafter allowing the mixture to foam, and

(III) curing the foamed composition.

## 4,147,848
## PROCESS FOR PURIFICATION OF ISOPRENE

Masatoshi Arakawa; Haruo Yamanouchi; Taro Okumura, and Teruo Yoshida, all of Yokkaichi, Japan, assignors to Japan Synthetic Rubber Co. Ltd., Tokyo, Japan

Filed Dec. 14, 1977, Ser. No. 860,595
Claims priority, application Japan, Dec. 20, 1976, 51-153026
Int. Cl.[2] C08F *136/08*; C07C *7/04, 11/18*
U.S. Cl. 526—77 13 Claims




1. A process for purifying a crude isoprene containing polymerization inhibiting material which comprises distilling the crude isoprene in the presence of 10 to 90 mole percent of at least one member selected from the group consisting of saturated hydrocarbons containing 6 to 8 carbon atoms in a first distillation zone withdrawing the polymerization inhibiting materials as an overhead fraction and withdrawing isoprene substantially free of polymerization inhibiting materials as a bottom fraction.

---

## 4,147,849
## METHOD OF MAKING POLYMERS AND COPOLYMERS OF 1-OLEFINS

Joseph Liu, Hong Kong, Hong Kong; Howard L. Grimmett, Lincolnshire, Ill., and Yu-Tang Hwang, Clinton, Iowa, assignors to Chemplex Company, Rolling Meadows, Ill.

Division of Ser. No. 664,030, Mar. 4, 1976, Pat. No. 4,053,437.
This application May 16, 1977, Ser. No. 797,123
Int. Cl.[2] C08F *4/02, 10/02*
U.S. Cl. 526—96 17 Claims

1. The method of making polymers of 1-olefins of 2–8 carbon atoms and copolymers of said olefins and 1-olefins of 2–20 carbon atoms which comprises polymerizing said olefins under polymerizing conditions with an improved catalyst prepared by the method comprising: preparing a mixture by dispersing on a finely divided, difficult to reduce, inorganic support of the class consisting of silica, alumina, thoria, zirconia, titania, magnesia, and mixtures and composites thereof an organic chromium compound pyrolytically decomposable in the substantial absence of oxygen to deposit a catalyst residue including as a contaminant a carbon residue on said support; activating said mixture by subjecting the mixture to non-oxidative pyrolysis to and at an activating temperature within the range of 600°–2000° F., thereby depositing on said support a catalytically active residue including a black carbon deposit residue; and substantially removing said black carbon deposit by burning in an oxidizing gas at an elevated temperature for a short period of time sufficient to burn off said black carbon deposit residue, thereby simultaneously modifying and improving the characteristics of the activated catalyst.

## 4,147,850
## PROCESS FOR INCREASING MOLECULAR WEIGHT OF A POLYMER

Thomas W. Hutton, Doylestown, and Pamela J. Rogers, North Wales, both of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Division of Ser. No. 634,816, Nov. 24, 1975, Pat. No. 4,065,523.
This application May 18, 1977, Ser. No. 798,041
Int. Cl.[2] C08F *220/14, 220/28*
U.S. Cl. 526—207 5 Claims

1. A process of preparing an addition copolymer of increased molecular weight comprising the steps of copolymerizing by gradual addition, free-radical solution polymerization in an organic solvent at reflux temperature in the presence of 0.1 to 5 parts of water per 100 parts of monomers, the monomers consisting essentially of

(1) from about 85 to about 99.5 parts by weight of a monomer or monomers selected from alkyl ($C_{2-18}$) or alkoxyalkyl acrylate, and

(2) from about 0.5 to about 15 parts by weight of an ethylenically unsaturated amine, carboxylic acid, sulfonic acid, or mixtures thereof, said monomers being such as to obtain said addition copolymer as one having a $T_g$ in the range of from 0° to -85° C., and recovering said copolymer.

---

## 4,147,851
## FLUORINE-CONTAINING OIL- AND WATER-REPELLANT COPOLYMERS

Stuart Raynolds, Wilmington, Del., assignor to E. I. Du Pont De Nemours and Company, Wilmington, Del.

Filed Jun. 13, 1978, Ser. No. 915,152
Int. Cl.[2] C08F *220/24*
U.S. Cl. 526—245 17 Claims

1. A copolymer comprising the following components:

(i) from 50 to 85 percent by weight of units derived from a monomer of the formula

$$R_fQO_2CC(R)=CH_2$$

wherein

$R_f$ is a straight- or branched-chain perfluoroalkyl group containing from 2 to 20 carbon atoms,

R is H or $CH_3$,

Q is alkylene of 1 to 15 carbon atoms, hydroxyalkylene of 3 to 15 carbon atoms,

$$-C_nH_{2n}(OC_qH_{2q})_m-,$$

$$-SO_2NR^1(C_nH_{2n})-,$$

or

$$-CONR^1(C_nH_{2n})-,$$

$R^1$ is H or $C_{1-4}$ alkyl,

$n$ is 1 to 15,

$q$ is 2 to 4, and

$m$ is 1 to 15; and

(ii) from 50 to 15 percent by weight of units derived from a monomer or a mixture of monomers selected from the group

$$(CH_2=C(R)COZ(CH_2)_r{}^+NR^2R^3R^4)X^-$$

and

$$CH_2=C(R)COZ(CH_2)_rNR^2R^3(O)$$

wherein

R is H or $CH_3$,

$R^2$ and $R^3$ are each $C_{1-4}$ alkyl, hydroxyethyl, benzyl or $R^2$ and $R^3$ together with the nitrogen atom form a morpholine, pyrrolidine or piperidine ring,

$R^4$ is H or $C_{1-4}$ alkyl or $R^2$, $R^3$ and $R^4$ together with the nitrogen atom form a pyridine ring,
Z is —O— or —$NR^4$—,
r is 2 to 4, and
$X^-$ is an anion.

---

**4,147,852**

## HIGH MOLECULAR WEIGHT POLYMERS OF PHENYLMALEIC ANHYDRIDE

**John W. Bozzelli, and Kent S. Dennis, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed Jul. 25, 1975, Ser. No. 599,193**
**Int. Cl.² C08F 4/04, 4/34**
**U.S. Cl. 526—272** **6 Claims**

1. A process for making high molecular weight polymers of phenylmaleic anhydride and one or more monovinyl aromatic monomers wherein the polymer has a viscosity greater than about 12 cps when measured as a 10% by weight solution in methyl ethyl ketone at 25° C., said process comprising
(a) reacting a mixture of 3 to about 6 moles of the aromatic monomer per mole of phenylmaleic anhydride, containing a free radical initiator, in the absence of solvent for about 4 hours or less at a temperature up to about 100° C. sufficient to activate the initiator, wherein the initiator is present in relatively large amounts of about 0.15 to 1% by weight of the monomers, and
(b) recovering the polymer formed.

---

**4,147,853**

## INTERNALLY PLASTICIZED VINYL CHLORIDE COPOLYMER

**Jagadish C. Goswami, New City, and Robert Querido, South Spring Valley, both of N.Y., assignors to Stauffer Chemical Company, Westport, Conn.**

**Continuation-in-part of Ser. No. 801,957, May 31, 1977, which is a continuation-in-part of Ser. No. 763,185, Jan. 27, 1977, abandoned. This application Dec. 5, 1977, Ser. No. 857,051**
**Int. Cl.² C08F 30/02, 230/02**
**U.S. Cl. 526—278** **14 Claims**

1. An internally plasticized copolymer of:
a. from about 50% to about 85%, by weight, of vinyl chloride;
b. from about 3% to about 47%, by weight, of a $C_6$–$C_{10}$ alkyl acrylate; and
c. from about 3% to about 47%, by weight, of a bis (hydrocarbyl)vinylphosphonate.

---

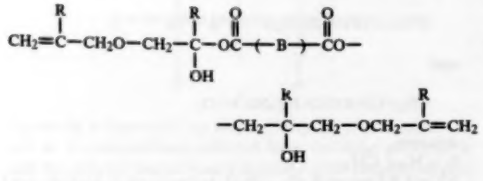
**4,147,854**

## LIQUID VINYLIDENE TERMINATED POLYMERS

**Douglas E. Skillicorn, Avon Lake, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio**

**Division of Ser. No. 585,962, Jun. 11, 1975, Pat. No. 4,013,710, which is a division of Ser. No. 292,926, Sep. 28, 1972, Pat. No. 3,910,992. This application Nov. 3, 1976, Ser. No. 738,194**
**Int. Cl.² C08F 8/14; C07C 69/34; C08F 18/16**
**U.S. Cl. 526—312** **4 Claims**

1. A liquid vinylidene-terminated polymer having a molecular weight of from about 1000 to about 20,000 as measured using a Mechrolab Vapor Pressure Osmometer and of the structure



wherein B is a polymeric backbone of carbon-carbon linkages derived from polymerized units of dienes containing 4 to about 10 carbon atoms interpolymerized with vinyl nitriles and R is hydrogen or an alkyl radical containing 1 to 4 carbon atoms.

---

**4,147,855**

## ORGANOPOLYSILOXANE COMPOSITIONS AND ELASTOMERS OBTAINED THEREFROM

**August Schiller, Marktl; Norman Dorsch, Fuchshausen, and Owsin Sommer, Burghausen, all of Fed. Rep. of Germany, assignors to Wacker-Chemie GmbH, Munich, Fed. Rep. of Germany**

**Filed Oct. 28, 1977, Ser. No. 846,281**
**Claims priority, application Fed. Rep. of Germany, Nov. 25, 1976, 2653499**
**Int. Cl.² C08G 77/04**
**U.S. Cl. 528—23** **6 Claims**

1. A composition which can be stored under anhydrous conditions but when exposed to atmospheric moisture cures at room temperature to an elastomer comprising a diorganopolysiloxane having reactive terminal groups, a silicon compound having at least one nitrogen atom and at least three hydrolyzable groups per molecule, a reinforcing filler and a phosphoric acid ester.

---

**4,147,856**

## EPOXY RESIN COMPOSITIONS (CASE A) CONTAINING CUMENE-MALEIC ANHYDRIDE RESIDUE

**Edward T. Sabourin, Allison Park, and Walter P. Barie, Jr., Glenshaw, both of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.**

**Filed Feb. 21, 1978, Ser. No. 879,447**
**Int. Cl.² C08G 59/16, 59/18, 59/68**
**U.S. Cl. 528—92** **15 Claims**

1. A new composition capable of being cured to a solid resin highly resistant to boiling acetone which comprises:
(a) a 1,2-epoxy resin containing on the average more than one 1,2-epoxy group per molecule;
(b) a residue remaining from the process wherein cumene is reacted with maleic anhydride to obtain a reaction product containing dimethylbenzyl succinic anhydride, 5-phenyl-5-methylhexane-1,2,3,4-tetracarboxylic acid dianhydride and addition products of cumene and maleic anhydride containing more than two anhydride groups per molecule and wherein a sufficient amount of said dimethylbenzyl succinic anhydride is removed from said reaction product to give a residue containing a maximum of 25 weight percent dimethylbenzyl succinic anhydride; and
(c) an accelerator.

---

**4,147,857**

## EPOXY CURE WITH POLYAMINE-POLYETHER SUCCINIMIDE SYSTEMS

**Harold G. Waddill, and Heinz Schulze, both of Austin, Tex., assignors to Texaco Development Corp., New York, N.Y.**

**Filed Mar. 30, 1978, Ser. No. 891,790**
**Int. Cl.² C08G 59/56, 59/46**
**U.S. Cl. 528—94** **19 Claims**

1. An epoxy resin composition having superior adhesion properties and being the cured product of a curable admixture which comprises:
a vicinal polyepoxide having an average of at least 1.8 reactive 1,2-epoxy groups per molecule;
a curing amount of a polyamine curing agent having at least 3 reactive amino hydrogens; and,
an effective amount of a succinimide additive comprising a polyoxyalkylenepolyamine-maleic anhydride condensation product having (thioureide), ureide or thioformamide or formamide end groups.

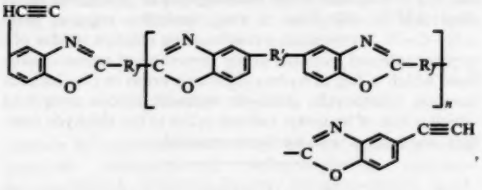
4,147,858

## FLUOROCARBON ETHER BIBENZOXAZOLE OLIGOMERS CONTAINING REACTIVE ACETYLENIC TERMINAL GROUPS

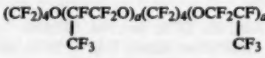
Robert C. Evers, Dayton, Ohio, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jul. 19, 1978, Ser. No. 925,900
Int. Cl.[2] C08G *73/22*
U.S. Cl. 528—210 6 Claims

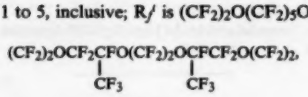
1. A fluorocarbon ether bibenzoxazole oligomer having the following structural formula:



wherein $R_f$ is $CF_2(OCF_2CF_2)_xO(CF_2)_5O(CF_2CF_2O)_yCF_2$, where x + y equals 4 to 7, inclusive, $CF_2O(CF_2)_2OCF_2$, $(CF_2)_4O(CF_2)_2OCF_2$, $(CF_2)_4O$-$(CF_2)_4O(CF_2)_4$, or



where a is 1 to 5, inclusive; $R_f'$ is $(CF_2)_2O(CF_2)_5O(CF_2)_2$,



$(CF_2)_2O(CF_2)_2O(CF_2)_2O(CF_2)_5O(CF_2)_2$, or $(CF_2)_2O(CF_2)_2O(CF_2)_2O(CF_2)_2$; and n is from 1 to 4, inclusive.

---

4,147,859

## PROCESS FOR REMOVAL OF CHLOROFORM AND CARBON TETRACHLORIDE FROM CHLORINATED POLYVINYL CHLORIDE

Ronald J. Davis, Brecksville, Ohio, and Thomas W. Boyer, Kincardine, Canada, assignors to The B. F. Goodrich Company, Akron, Ohio

Filed Oct. 11, 1977, Ser. No. 840,895
Int. Cl.[2] C08F *8/22*
U.S. Cl. 528—496 12 Claims

1. A process for stripping minor quantities, less than about 5 percent by weight based on solid resin, of hydrochloromethylene and carbon tetrachloride contaminants in the presence of residual water from solid, contaminated chlorinated polyvinyl chloride resin essentially free of viny chloride monomer, comprising the steps of (i) continuously flowing said resin contaminated with each of said contaminants downwardly through a stripping column or stripper at a temperature below that which is deleterious to said resin; (ii) injecting a stripping agent, selected from the group consisting of a lower primary alcohol having from 1 to about 7 carbon atoms, and a normally liquid alkane having from about 5 to about 9 carbon atoms, in the vapor phase to flow upwardly in said stripper, countercurrent to said resin and in contact therewith to strip said contaminants from said resin; (iii) removing substantially all of said contaminants and a portion of said stripping agent from overhead said stripper; and, (iv) recovering from said stripper essentially contaminant-free resin contaminated with less than 10 ppm each, based on solid resin, of said hydrochloromethylene and carbon tetrachloride.

4,147,860

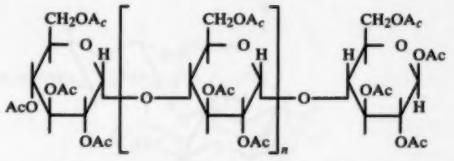
## PROCESS FOR PREPARING NITROAROMATIC GLYCOSIDES

William B. Farnham, and Alexander L. Johnson, both of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

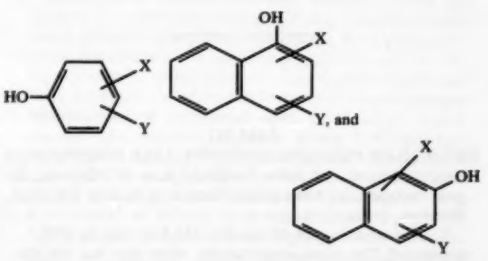
Continuation-in-part of Ser. No. 704,974, Jun. 17, 1976, abandoned. This application Apr. 20, 1978, Ser. No. 898,442
Int. Cl.[2] C07H *15/00*
U.S. Cl. 536—4 10 Claims

1. A process for preparing α and β nitroaromatic glycosides comprising:

(a) contacting an acetylated glycoside of the formula:



wherein Ac is an acetyl group, and n is an integer of 2, 3 or 4, with a phenol selected from the group consisting of



wherein X and Y are individually H, $NO_2$, halogen, alkyl of 1 to 4 carbon atoms, OR′ or $CO_2R'$ where R′ is an alkyl group of 1 to 6 carbon atoms, with the proviso that only one of X and Y is $NO_2$, in the presence of a catalyst at a temperature in the range of about 80°–120° C;

(b) nitrating the product of (a) by contacting said product with:

(i) nitric acid contained in a mixture of acetic acid and sulfuric acid, or

(ii) a nitronium compound selected from nitronium tetrafluoroborate, nitronium hexafluorophosphate and nitronium trifluoromethanesulfonat contained in dichloromethane, chloroform or 1, 2-dichloroethane; and

(c) deacetylating the product of (b) by contacting said product with:

(i) a catalytic amount of an alkali metal lower alkoxide contained in the corresponding alcohol, or

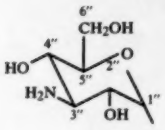
(ii) a solution of anhydrous ammonia or HCl in methanol.

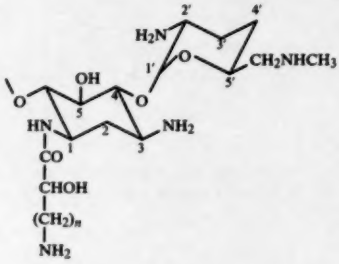
## 4,147,861
## 1N-(α-HYDROXY-ω-AMINOALKANOYL)-6'N-METHYL-3',4'-DIDEOXYKANAMYCIN B AND THE PRODUCTION THEREOF

Hamao Umezawa; Kenji Maeda, both of Tokyo; Shinichi Kondo, Yokohama, and Sumio Umezawa, Tokyo, all of Japan, assignors to Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai, Tokyo, Japan

Continuation of Ser. No. 616,466, Sep. 24, 1975, abandoned. This application Dec. 29, 1977, Ser. No. 865,470
Int. Cl.[2] C07H *15/22*
U.S. Cl. 536—10 5 Claims

1. A 1N-(α-hydroxy-ω-aminoalkanoyl)-6'N-methyl-3',4'-dideoxykanamycin B of the formula:





wherein n is 1, 2 or 3; or a pharmaceutically acceptable acid addition salt thereof.

---

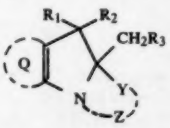
## 4,147,862
## METHOD OF PREPARING STYRYL-LIKE COMPOUNDS

Masaaki Hayami, and Seiko Torikoshi, both of Okayama, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Continuation-in-part of Ser. No. 611,834, Sep. 9, 1975, abandoned. This application Oct. 21, 1976, Ser. No. 734,626
Claims priority, application Japan, Sep. 18, 1974, 49/108090
Int. Cl.[2] C07D *498/04, 513/04*
U.S. Cl. 542—415 7 Claims

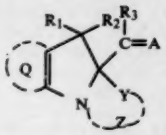
1. A method of preparing a styryl-like compound characterized in that

an indoline derivative of formula (3):



(3)

is reacted with one substance selected from the group consisting of aromatic aldehydes, heterocyclic aldehydes, aromatic nitroso compounds and heterocyclic nitroso compounds, to form a styryl-like compound represented by the following chemical formula (1):



(1),

wherein Q is unsubstituted benzene, substituted benzene, or condensed ring; each of $R_1$ and $R_2$ is lower alkyl, hydroxyalkyl or alkoxyalkyl; $R_3$ is hydrogen, alkyl, alkoxy, halogen, nitrile, aromatic or phenoxy; Y represents oxygen or sulfur; Z is alkylene of 2 to 4 carbon atoms unsubstituted or substituted by an alkyl which will form a ring structure together with —N—C—Y; A represents a condensation reaction residue of a member selected from the group consisting of aromatic aldehyde which is free of hydroxyl radicals ortho to the aldehyde function, heterocyclic aldehyde, aromatic nitroso compound which is free of hydroxyl radicals ortho to the aldehyde function, and heterocyclic nitroso compound.

---

## 4,147,863
## 7-D-(−)-MANDELAMIDO-3-(1-METHYL-1H-TETRAZOL-5-YL)VINYL-3-CEPHEM-4-CARBOXYLIC ACID

Tetsuo Miyadera; Mitsuo Nagano, and Shinichi Sugawara, all of Tokyo, Japan, assignors to Sankyo Company Limited, Tokyo, Japan

Filed Aug. 25, 1975, Ser. No. 607,690
Claims priority, application Japan, Sep. 4, 1974, 49-101693
Int. Cl.[2] C07C *501/60*
U.S. Cl. 542—436 1 Claim

1. 7-D(−)mandelamido-3-(1-methyl-1H-tetrazol-5-yl)vinyl-3-cephem-4-carboxylic acid.

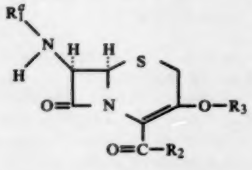
---

## 4,147,864
## PROCESS FOR THE MANUFACTURE OF 7β-AMINO-3-CEPHEM-3-OL-4 CARBOXYLIC ACID COMPOUNDS

Robert B. Woodward, Cambridge, Mass., and Hans Bickel, Binningen, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

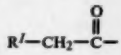
Continuation of Ser. No. 551,483, Feb. 20, 1975, abandoned. This application Dec. 2, 1976, Ser. No. 746,927
Int. Cl.[2] C07D *501/02*
U.S. Cl. 544—16 16 Claims

1. Process for the manufacture of a 7β-amino-3-cephem-3-ol-4-carboxylic acid compound of the formula



(IA),

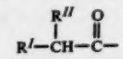
wherein $R_1^a$ represents an acyl group of the formula



(A'),

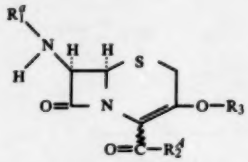
wherein $R^1$ represents lower alkyl, halogeno-lower alkyl, phenyloxy-lower alkyl, hydroxyphenyloxy-lower alkyl, protected hydroxyphenyloxy-lower alkyl, halogeno-phenyloxy-lower alkyl, or lower alkyl substituted by amino and carboxyl, wherein amino is free or protected and carboxyl is free or protected, or $R^1$ represents lower alkenyl, phenyl, hydroxyphenyl, protected hydroxyphenyl, halogenophenyl, hydroxy-halogeno-phenyl, protected hydroxy-halogeno-phenyl, amino-

lower alkyl-phenyl, protected amino-lower alkyl-phenyl, phenyloxyphenyl, or $R^I$ represents pyridyl, thienyl, furyl, imidazolyl or tetrazolyl, or these heterocyclic groups substituted by lower alkyl, amino, protected amino, aminomethyl or protected aminomethyl, or $R^I$ represents lower alkoxy, phenyloxy, hydroxyphenyloxy, projected hydroxyphenyloxy, halogenophenyloxy, lower alkylthio, lower alkenylthio, phenylthio, pyridylthio, 2-imidazolylthio, 1,2,4-triazol-3-ylthio, 1,3,4-triazol-2-ylthio, 1,2,4-thiadiazol-3-ylthio, 1,3,4-thiadiazol-2-ylthio, or 5-tetrazolthio, and these heterocyclylthio groups, substituted by lower alkyl, or $R^I$ represents halogeno, lower alkoxycarbonyl, cyano, carbamoyl, N-lower alkyl-carbamoyl, N-phenylcarbamoyl, lower alkanoyl, benzoyl, or azido, or $R_1{}^a$ represents an acyl group of the formula



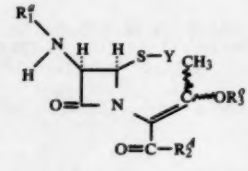
(A''),

wherein $R^I$ represents lower alkyl, phenyl, hydroxyphenyl, protected hydroxyphenyl, halogenophenyl, hydroxy-halogenophenyl, protected hydroxy-halogeno-phenyl, furyl, thienyl, or isothiazolyl, or 1,4-cyclohexadienyl, and $R^{II}$ represents amino, protected amino, azido, carboxyl, protected carboxyl, cyano, sulpho, hydroxyl, protected hydroxyl, O-lower alkyl-phosphono, O,O'-di-lower alkyl-phosphono or halogeno, $R_2$ represents hydroxyl, or a group $R_2{}^A$ which is halogen or which together with the carbonyl grouping —C(=O)— forms an esterified protected carboxyl group, and $R_3$ represents hydrogen, lower alkyl, phenyl-lower alkyl, diphenyl-lower alkyl or tri-lower alkyl silyl, the corresponding 2-cephem compound of the formula



(IB)

wherein $R_1{}^a$, $R_2{}^A$ and $R_3$ have the abovementioned meanings, or a mixture of a compound of the formula IA and IB, or salts of such compounds with salt-forming groups, characterised in that a compound of the formula



(II)

wherein $R_1{}^a$, and $R_2{}^A$ have the meanings mentioned under formula IA, $R_3{}^*$ represents lower alkyl phenyl-lower alkyl, diphenyllower alkyl or tri-lower alkyl silyl, and Y represents a leaving group of the formula —S-$R_4$, wherein $R_4$ is 1-methyl-imidazol-2-yl, 1,3-thiazol-2-yl, 1,3,4-thiadiazol-2-yl, 1,3,4,5-thiatriazol-2-yl, 1,3-oxazol-2-yl, 1,3,4-oxadiazol-2-yl, 1,3,4,5-oxatriazol-2-yl, 2-quinolyl, 1-methyl-benzimidazol-2-yl, benzthiazol-2-yl or benzoxazol-2-yl, or Y represents a leaving group of the formula —$SO_2$-$R_5$, wherein $R_5$ represents phenyl, or phenyl substituted by lower alkyl, lower alkoxy, halogen, phenyl, phenyloxy, or nitro, is treated in an inert solvent at temperatures of between room temperature and 50° C. with a diazabicycloalkene, a tetra-lower alkylguanidine or a trilower alkylamine.

4,147,865

## BENZ-(c,d)-INDOLYL COMPOUNDS

Horst Harnisch, Cologne, and Alfred Brack, Odenthal, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

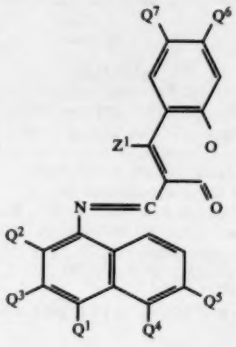
Continuation of Ser. No. 763,142, Jan. 27, 1977, abandoned. This application Mar. 27, 1978, Ser. No. 890,688

Claims priority, application Fed. Rep. of Germany, Jan. 30, 1976, 2603592

Int. Cl.[2] C07D 413/14

U.S. Cl. 544—142 3 Claims

1. Dyestuff of the formula



wherein

$Z^1$ represents OH or $NT^1T^2$;

$T^1$ represents H; or $C_1$–$C_4$-alkyl which is unsubstituted or substituted by $C_1$–$C_2$-alkoxy or chlorine;

$T^2$ represents H; or $C_1$–$C_4$-alkyl which is unsubstituted or substituted by $C_1$–$C_2$-alkoxy or chlorine; or conjointly with $T^1$ represents —$(CH_2)_2$-T-$(CH_2)_2$–;

T represents —O–; —NH–; -N($CH_3$)—; —$CH_2$–; or a direct bond;

$Q^1$ represents H; fluorine; chlorine; bromine; iodine; hydroxyl: $C_1$–$C_4$-alkoxy; cyclohexyloxy; benzyloxy; phenoxy; phenylsulphonyloxy; sulphydryl; $C_1$–$C_4$-alkylmercapto unsubstituted or substituted with OH, Cl, Br, CN, $C_1$–$C_2$-alkoxy, benzyloxy or $C_1$—$C_2$-alkoxycarbonyl; benzylmercapto; p-tolylmethylmercapto; phenylmercapto unsubstituted or substituted with $C_1$–$C_4$-alkyl, $C_1$–$C_2$-alkoxy, $CF_3$, chlorine, bromine, amino, C–$C_2$-alkylcarbonylamino, $C_1$—$C_2$-alkylsulphonylamino, chlorosulphonyl, $Q^8$O-SO—, $Q^9Q^{10}$N-$SO_2$- or nitro; naphthylmercapto; amino monosubstituted or disubstituted with $C_1$–$C_4$-alkyl or benzyl or monosubstituted by phenyl; $C_1$–$C_4$-alkylcarbonylaminoor -sulphonylamino unsubstituted or substituted with chlorine; $C_1$–$C_4$-alkylureido; phenylureido; $C_1$–$C_2$-alkoxycarbonylamino; phenoxycarbonylamino; benzoylamino unsubstituted or substituted with methyl, methoxy, or chlorine; nitro; $C_1$–$C_4$-alkylsulphonyl unsubstituted or substituted with chlorine or hydroxyl; phenylsulphonyl or phenylsulphinyl unsubstituted or substituted with $C_1$–$C_4$-alkyl, chlorine, or bromine; chlorosulphonyl; $Q^8$O-$SO_2$—; $Q^9Q^{10}$N-$SO_2$-; $Q^9Q^{10}$N-CO—; $Q^{11}$O-CO—; or cyano;

$Q^2$ represents hydrogen, chlorine bromine, phenylmercapto or ethyl;

$Q^3$ represents hydrogen or bromine;

$Q^4$ represents hydrogen, $C_1$–$C_2$-alkoxy, chlorine, bromine, or phenylmercapto;

$Q^5$ represents hydrogen or bromine;

$Q^6$ represents hydrogen, methyl, hydroxyl, $C_1$–$C_4$-alkoxy, benzyloxy, di-($C_1$–$C_2$-alkyl)-amino, chlorine, or bromine;

$Q^7$ represents hydrogen, methyl, $C_1$–$C_2$-alkoxy, chlorine, or bromine or, conjointly with $Q^6$, represents methylenedioxy or —CH=CH-CH=CH- which is linked to position 5 of the coumarin ring system;

$Q^8$ represents H; $C_4$–$C_8$-alkyl, cyclohexyl unsubstituted or substituted with methyl; or phenyl-$C_1$–$C_3$-alkyl;

$Q^9$ represents unsubstituted $C_1$–$C_6$-alkyl; $C_1$–$C_3$-alkyl which is substituted by OH, Cl, CN, $C_1$–$C_2$-alkoxy, di-($C_1$–$C_2$-alkyl)-amino, morpholino, or tri-($C_1$–$C_2$-alkyl)-ammonium, or phenyl-$C_1$–$C_2$-alkyl, cyclohexyl or cyclohexylmethyl;

$Q^{10}$ represents H; unsubstituted $C_1$–$C_4$-alkyl; or $C_1$–$C_2$-alkyl which is substituted by Oh, Cl, CN or $C_1$–$C_2$-alkoxy; or conjointly with $Q^9$ represents $—(CH_2)_2\text{-}T\text{-}(CH_2)_2—$; and $Q^{11}$ represents H, $C_1$–$C_2$-alkyl, phenyl-$C_1$–$C_2$-alkyl, or phenyl; and wherein either $T^1$ and $T^2$ or $Q^9$ and $Q^{10}$ or both represent $—(CH_2)_2\text{-}T\text{-}(CH_2)_2—$; or an acid salt of the dyestuff with inorganic or organic colorless acids when $Z^1{=}NT^1T^2$.

---

**4,147,866**

## PROCESS FOR PREPARING PHOSPHOROTHIOATES AND PHENYLPHOSPHONOTHIOATES

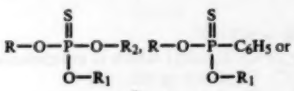
**Harold H. Freedman, Newton Center, Mass.; Stanley D. McGregor; Masao Yoshimine, both of Midland, Mich., and Lorraine M. Kroposki, Walnut Creek, Calif., assignors to The Dow Chemical Company, Midland, Mich.**

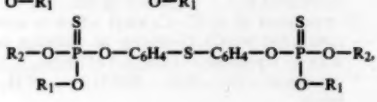
**Division of Ser. No. 742,144, Nov. 15, 1976, Pat. No. 4,096,210, which is a division of Ser. No. 585,554, Jun. 10, 1975, Pat. No. 4,007,197. This application Feb. 22, 1978, Ser. No. 879,922**

**Int. Cl.² C07D *239/30, 239/32***

**U.S. Cl. 544—243** **12 Claims**

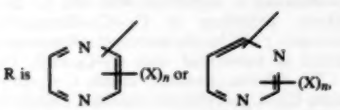
1. In the process of preparing a compound corresponding to the formula





wherein:

$R_1$ and $R_2$ are each independently lower alkyl; and

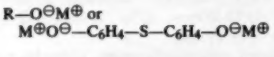


wherein:

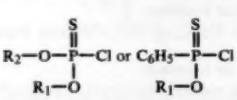
n is 0, 1, 2 or 3; and

X is nitro, cyano, halo, lower alkyl, lower alkoxy, lower alkylthio or lower alkylsulfinyl,

with the proviso that R does not bear more than one nitro group, lower alkylthio group or lower alkylsulfinyl group; by reacting in an inert liquid reaction medium under alkaline conditions (a) a compound corresponding to the formula



with (b) a compound corresponding to the formula



wherein M is an alkali metal and R, $R_1$ and $R_2$ have the aforesaid meaning;

the improvement consisting of conducting the process in the presence of a small but catalytic amount of (1) a quaternary ammonium or phosphonium salt having a minimum solubility of at least 1 weight percent in the liquid reaction medium at 25° C. and (2) an organic, sterically unhindered, nucleophilic tertiary amine, with the proviso that said amine is not 1,4-diazabicyclo[2.2.2]octane or an N-substituted diazole when (1) is a quaternary ammonium salt.

---

**4,147,867**

## 2-DIMETHYLAMINO-6-DIETHYLENIMIDOPHOSPHAMIDO-7-METHYL-PURINE

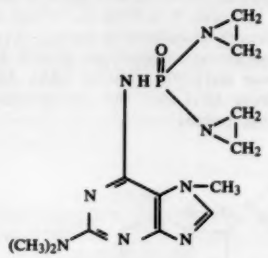
**Elena S. Golovchinskaya, B. Cherkizovskaya ulitsa, 5, korpus 1, kv. 283; Vladimir A. Chernov, Komsomolsky prospekt, 44, kv. 72; Elena S. Chaman, Leninsky prospekt, 70/11, kv. 300; Ljudmila A. Nikolaeva, ulitas Vinokurova 12, korpus 2, kv. 15, and Vyacheslav S. Korsunsky, I Kozhukhovsky proezd 19, kv. 56, all of Moscow, U.S.S.R.**

**Continuation of Ser. No. 603,387, Aug. 11, 1975, abandoned, which is a continuation of Ser. No. 500,557, Aug. 26, 1974, abandoned, which is a division of Ser. No. 339,346, Mar. 8, 1973, abandoned. This application Sep. 28, 1976, Ser. No. 727,515**

**Int. Cl.² C07F *9/65*; A61K *31/41***

**U.S. Cl. 544—244** **1 Claim**

1. 2-dimethylamino-6-diethyleneimidophosphamide-7-methylpurine having the formula



---

**4,147,868**

## ACETYLENE-SUBSTITUTED AROMATIC BENZILS AND ACETYLENE-TERMINATED QUINOXALINE COMPOSITIONS

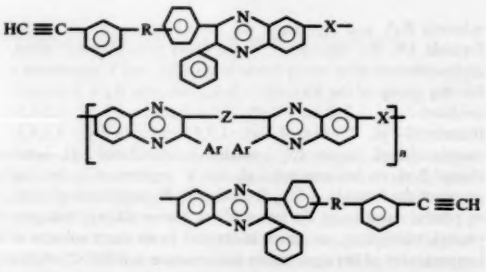
**Fred E. Arnold, Centerville, and Frederick L. Hedberg, Dayton, both of Ohio, assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Division of Ser. No. 762,078, Jan. 24, 1977, Pat. No. 4,098,825. This application Jan. 19, 1978, Ser. No. 870,705**

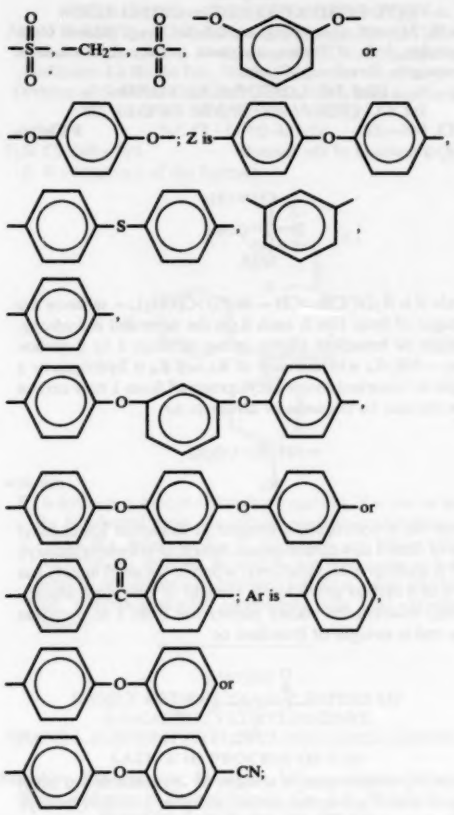
**Int. Cl.² C07D *241/44, 241/42***

**U.S. Cl. 544—353** **6 Claims**

1. An acetylene terminated quinoxaline composition having the following formula:



wherein X is a single bond, —O—, —S—,



R is —O— or —S—; and n is an integer ranging from 1 to 20, inclusive.

---

**4,147,869**

## 3,4-DIHYDROCARBOSTYRIL DERIVATIVES AND PROCESS FOR PREPARING THE SAME

**Kazuyuki Nakagawa, and Yasuo Oshiro, both of Tokushima, Japan, assignors to Otsuka Pharmaceutical Co., Ltd., Tokyo, Japan**

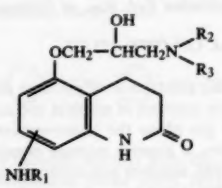
**Filed May 9, 1977, Ser. No. 795,042**

**Claims priority, application Japan, May 8, 1976, 51-52588; Feb. 25, 1977, 52-20692**

**Int. Cl.[2] C07D** *401/12, 315/38, 315/40*

**U.S. Cl. 544—363** **7 Claims**

1. A 3,4-dihydrocarbostyril derivative represented by the formula (I)



(I)

wherein $R_1$ represents an alkylcarbonyl group, a cycloakylcarbonyl group, an alkylsufonyl group, a phenylsulfonyl group, a carbamoyl group or an alkoxycarbonyl group, $R_2$ and $R_3$, which may be the same or different, each represents a hydrogen atom, an alkyl group, a phenylalkyl group or a phenoxyalkyl group, or $R_2$ and $R_3$ can form, when taken together with the nitrogen atom to which they are attached, a heterocyclic group selected from the group consisting of piperidono, pyrrolidino, morpholino and 1-piperazinyl which may be substituted with a phenyl group or an alkyl group having 1 to 4 carbon atoms, with the proviso that, when the group $—NHR_1$ is attached to the 8-position of the 3,4-dihydrocarbostyril nucleus in which $R_1$ represents an alkylcarbonyl group, and $R_2$ represents a hydrogen atom or an alkyl group, $R_3$ is a phenyl alkyl group or a phenoxy alkyl group, or $R_2$ and $R_3$ can form, when taken together with the nitrogen atom to which they are attached, said heterocyclic group, and the pharmaceutically acceptable acid addition salts thereof.

---

**4,147,870**

## 1-ARYLAMIDOETHYL, 4-SULFONYLPIPERAZINES

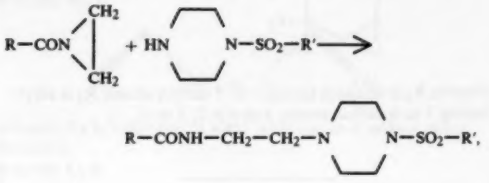
**Antonio A. García, Guadalajara; Juan R. C. Ruiz, and Juan B. Lozano, both of Madrid, all of Spain, assignors to Laboratorios Liade, S.A., Madrid, Spain**

**Continuation-in-part of Ser. No. 687,947, May 19, 1976, abandoned. This application Nov. 18, 1977, Ser. No. 852,850**

**Int. Cl.[2] C07D** *241/04*

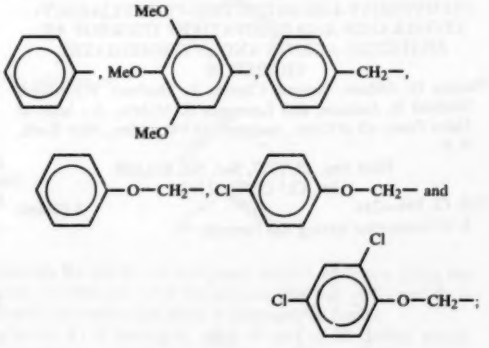
**U.S. Cl. 544—383** **1 Claim**

1. A method of synthesizing piperazine derivatives comprising the step of reacting the corresponding acyl-aziridine with the monosulfonyl derivative of piperazine according to the reaction



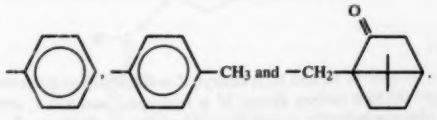
wherein:

R is selected from the group consisting of



and

R′ is selected from the group consisting of



**4,147,871**

## CYCLOHEXANETETROL DERIVATIVES

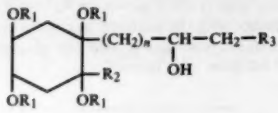
**Frederic P. Hauck, Somerville, and Rita T. Fox, Princeton, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.**

**Division of Ser. No. 795,465, May 10, 1977, Pat. No. 4,103,094. This application Apr. 28, 1978, Ser. No. 900,839**

**Int. Cl.[2] C07D *295/14***

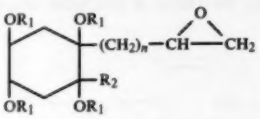
**U.S. Cl. 544—394** **17 Claims**

1. A compound having the formula



or a pharmaceutically acceptable salt thereof, wherein $R_1$ is alkanoyl having 1 to 7 carbon atoms; $R_2$ is alkyl; $R_3$ is alkylamino, dialkylamino, 1-piperazinyl, 4-alkyl-1-piperazinyl, 4-aryl-1-piperazinyl, 4-aryl-1,2,3,6-tetrahydro-1-pyridinyl, N-alkyl-N-[(2-pyridinyl)alkyl]amino, N-alkyl-N-[(3-pyridinyl)-alkyl]amino or N-alkyl-N-[(4-pyridinyl)alkyl]amino; and n is 1, 2 or 3; wherein aryl is phenyl or phenyl substituted with one or two halogen, alkyl, trifluoromethyl, alkoxy or alkylthio groups and wherein alkyl, alkoxy and alkylthio are groups having 1 to 6 carbon atoms.

17. A compound having the formula



wherein $R_1$ is alkanoyl having 1 to 7 carbon atoms; $R_2$ is alkyl having 1 to 6 carbon atoms; and n is 1, 2 or 3.

---

**4,147,872**

## 3-[2-HYDROXY-4-(SUBSTITUTED)-PHENYL]AZACYCLOALKANES AND DERIVATIVES THEREOF AS ANALGESIC AGENTS AND INTERMEDIATES THEREFOR

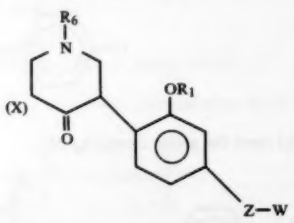
**Thomas H. Althuis, Groton; Charles A. Harbert, Waterford; Michael R. Johnson, and Lawrence S. Melvin, Jr., both of Gales Ferry, all of Conn., assignors to Pfizer Inc., New York, N.Y.**

**Filed Sep. 13, 1977, Ser. No. 832,869**

**Int. Cl.[2] C07D *211/86***

**U.S. Cl. 546—216** **3 Claims**

1. A compound having the formula



wherein each of $R_1$ and $R_6$ is benzyl; Z is alkylene having from one to thirteen carbon atoms; W is hydrogen; and x is 1, and the pharmaceutically acceptable acid addition salts thereof.

**4,147,873**

## α-VINYL DERIVATIVES OF α-AMINO ACIDS

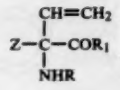
**Brian W. Metcalf, Strasbourg, and Michel Jung, Illkirch Graffenstaden, both of France, assignors to Merrell Toraude et Compagnie, Strasbourg, France**

**Filed Jul. 1, 1977, Ser. No. 812,050**

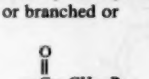
**Int. Cl.[2] C07D *211/60, 207/16*; C07C *101/28***

**U.S. Cl. 546—221** **9 Claims**

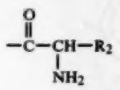
1. A compound of the formula



wherein Z is $R_1OCCH{=}CH-$ or $R_1OC(CH_2)_n-$ wherein n is an integer of from 1 to 3; each $R_1$ is the same and is hydroxy, a straight or branched alkoxy group of from 1 to 8 carbon atoms, $-NR_3R_4$ wherein each of $R_3$ and $R_4$ is hydrogen or a straight or branched lower alkyl group of from 1 to 4 carbon atoms and can be the same or different, or



wherein $R_5$ is hydrogen, a straight or branched lower alkyl group of from 1 to 4 carbon atoms, benzyl or p-hydroxybenzyl; and R is hydrogen, alkylcarbonyl wherein the alkyl moiety has from 2 to 4 carbon atoms and is straight or branched, alkoxycarbonyl wherein the alkoxy moiety has from 1 to 4 carbon atoms and is straight or branched or



wherein $R_2$ is hydrogen, a straight or branched lower alkyl group of from 1 to 4 carbon atoms, benzyl or p-hydroxybenzyl; and the lactams of said compounds wherein Z is $R_1OC(CH_2)_n-$ wherein n is the integer 2 or 3 and R is hydrogen; and pharmaceutically acceptable salts and individual optical isomers thereof.

---

**4,147,874**

## PROCESS FOR THE PRODUCTION OF PYRIDINE AND 3-METHYL PYRIDINE

**Helmut Beschke, and Heinz Friedrich, both of Hanau, Fed. Rep. of Germany, assignors to Deutsche Gold- und Silber Scheideanstalt vormals Roessler, Frankfurt, Fed. Rep. of Germany**

**Filed Jan. 24, 1978, Ser. No. 871,976**

**Claims priority, application Fed. Rep. of Germany, Jan. 26, 1977, 2703049**

**Int. Cl.[2] C07D *213/12***

**U.S. Cl. 546—251** **19 Claims**

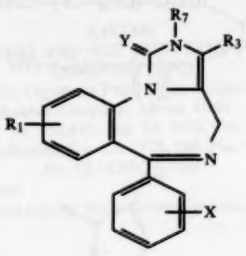
1. In a process for the production of pyridine and 3-methyl pyridine by the catalytic reaction of acrolein and acetaldehyde with ammonia in the gas phase the improvement consisting essentially of employing a gaseous mixture consisting essentially of (1) acetaldehyde, acrolein and ammonia or (2) acetaldehyde, acrolein, ammonia and an inert gas and employing as the catalyst a catalyst consisting essentially of highly dispersed aluminum silicate containing 3 to 30 weight percent aluminum oxide, a BET surface area of 200 to 800 $m^2/g$, a pore volume of 0.4 to 1.0 $cm^3/g$ and a pore diameter of 20 to $100 \times 10^{-8}$ cm.

## 4,147,875
## IMIDAZO[1,5-α][1,4]BENZODIAZEPINES

Armin Walser, West Caldwell; Rodney I. Fryer, North Caldwell, and Louis Benjamin, Livingston, all of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 776,820, Mar. 11, 1977. This application Jul. 27, 1978, Ser. No. 928,765
Int. Cl.[2] C07D *487/04*
U.S. Cl. 548—302 1 Claim

1. A compound of the formula



wherein

$R_1$ is hydrogen, halogen or trifluoromethyl; Y is oxo or thio; $R_3$ is selected from the group consisting of hydrogen, $—COOR_4$ wherein $R_4$ is hydrogen or lower alkyl, $—CONR_6R_5$ wherein $R_5$ and $R_6$ are hydrogen or lower alkyl; X is hydrogen or halogen; and $R_7$ is lower alkyl and the pharmaceutically acceptable salts and N-oxides thereof.

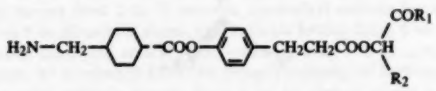
---

## 4,147,876
## EASILY HYDROLYZABLE ESTERS OF 4-(2-CARBOXYETHYL)PHENYL TRANS-4-AMINOMETHYLCYCLOHEXANECARBOXYLATE AND PROCESS OF USE

Masahiro Kamada, and Masataka Mimura, both of Tokyo, Japan, assignors to Daiichi Seiyaku Co., Ltd., Tokyo, Japan

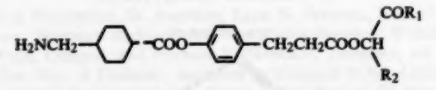
Filed May 1, 1978, Ser. No. 901,632
Int. Cl.[2] C07C *101/02*; A61K *31/24*
U.S. Cl. 560—37 12 Claims

1. A compound having the formula



wherein $R_1$ is a member selected from the group consisting of lower alkyl, substituted lower alkyl, aryl, lower alkoxy, and amino, and $R_2$ is a member selected from the group consisting of hydrogen, lower alkyl, aryl, lower acyl, lower alkoxycarbonyl, and cyano, and acid addition salts thereof.

11. A process for producing 4'-(2-carboxyethyl)phenyl trans-4aminomethylcyclohexanecarboxylate or its therapeutically useful acid-addition salts comprising hydrolyzing a compound represented by the formula:



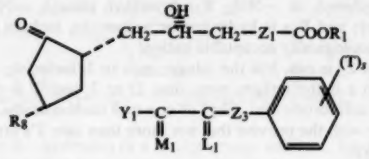
wherein $R_1$ is a member selected from the group consisting of lower alkyl, substituted lower alkyl, aryl, lower alkoxy an amino and $R_2$ is a member selected from the group consisting of hydrogen, lower alkyl, aryl, lower acyl, lower alkoxycarbonyl and cyano, or an acid-addition salt thereof, in water or an aqueous organic solvent, at pH 5–12, and at a temperature of from 0° to 100° C.

## 4,147,877
## ω-ARYL-6-HYDROXY-PGE$_1$ COMPOUNDS

Herman W. Smith, Kalamazoo Township, Kalamazoo County, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Continuation-in-part of Ser. No. 812,794, Jul. 5, 1977, Pat. No. 4,131,738. This application Jun. 23, 1978, Ser. No. 918,522
Int. Cl.[2] C07C *177/00*
U.S. Cl. 560—53 83 Claims

1. A prostacyclin analog of the formula



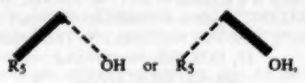
wherein $Z_1$ is

(1) $—(CH_2)_g—CH_2—CH_2—$,
(2) $—(CH_2)_g—CH_2—CF_2—$, or
(3) trans-$(CH_2)_g—CH=CH—$,

wherein g is the integer one, 2, or 3;
wherein $Y_1$ is

(1) trans-$CH=CH—$,
(2) cis-$CH=CH—$,
(3) $—CH_2CH_2—$,
(4) trans-$CH=C(Hal)—$, or
(5) $—C\equiv C—$,

wherein Hal is chloro or bromo;
wherein $M_1$ is

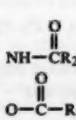


wherein $R_5$ is hydrogen or alkyl with one to 4 carbon atoms, inclusive;
wherein $L_1$ is

or a mixture of

and

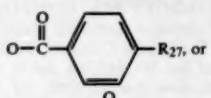
wherein $R_3$ and $R_4$ are hydrogen, methyl, or fluoro, being the same or different, with the proviso that one of $R_3$ and $R_4$ is fluoro only when the other is hydrogen or fluoro;
wherein $R_1$ is hydrogen; alkyl of one to 12 carbon atoms, inclusive; cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive; phenyl; phenyl substituted with one, two, or three chloro or alkyl of one to 3 carbon atoms; phenyl substituted in the para position by



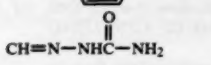
(a)
(b)

-continued

(c)



(d)



wherein $R_{25}$ is methyl, phenyl, acetamidophenyl, benzamidophenyl, or $-NH_2$; $R_{26}$ is methyl, phenyl, $-NH_2$, or methoxy; and $R_{27}$ is hydrogen or acetamido, inclusive; or a pharmacologically acceptable cation;
wherein $Z_3$ is oxa, h is the integer zero to 3, inclusive;
wherein s is the integer zero, one, 2, or 3, and T is chloro, fluoro, trifluoromethyl, alkyl of one to 3 carbon atoms, inclusive, or with the proviso that not more than two T's are other than alkyl.

---

**4,147,878**

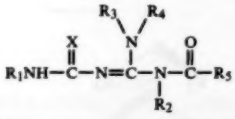
## HERBICIDAL CARBAMATES AND THIOLCARBAMATES

**Julius J. Fuchs, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Division of Ser. No. 732,282, Oct. 13, 1976, Pat. No. 4,097,673, which is a division of Ser. No. 520,114, Nov. 1, 1974, Pat. No. 4,004,915, which is a division of Ser. No. 356,422, May 2, 1973, Pat. No. 3,882,160, which is a continuation-in-part of Ser. No. 312,904, Dec. 7, 1972, Pat. No. 3,823,179. This application Apr. 17, 1978, Ser. No. 897,012**
**Int. Cl.[2] C07C *157/05***
**U.S. Cl. 560—115** **1 Claim**

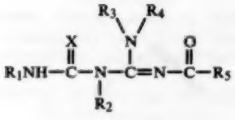
1. A compound having one of the following formulas

(1)



and

(2)



wherein
$R_1$ is selected from a $C_2$–$C_8$ alkyl substituted with 0–1 methoxy, ethoxy, methylthio, or ethylthio group; a $C_3$–$C_6$ alkenyl; a $C_3$–$C_6$ alkynyl; a $C_4$–$C_8$ cycloalkyl substituted with 0–1 $C_2$–$C_4$ alkyl, 0–2 methyl groups, 0–2 chlorine or bromine atoms, or 0–1 methoxy or ethoxy group; a $C_5$–$C_8$ cycloalkenyl; a $C_4$–$C_8$ cycloalkylmethyl or cycloalkenylmethyl; a $C_7$–$C_{10}$ bicycloalkyl or bicycloalkenyl; a $C_8$–$C_{11}$ bicycloalkylmethyl or bicycloalkenylmethyl; trimethylcyclohexyl; or tetramethylcyclohexyl;
$R_2$ is a $C_1$–$C_3$ alkyl;
$R_3$ is hydrogen, methyl, or ethyl;
$R_4$ is a $C_1$–$C_4$ alkyl, a $C_3$–$C_4$ alkenyl, a $C_3$–$C_4$ alkynyl, or methoxyl;
$R_5$ is $—OR_6$; wherein $R_6$ is a $C_1$–$C_8$ alkyl substituted with 0–3 chlorine atoms or 0–1 methoxyl; and
X is sulfur.

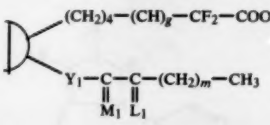
**4,147,879**

## 2,2-DIFLUORO-13,14 DIDEHYDRO-PGF$_1$ COMPOUNDS

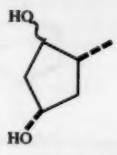
**Herman W. Smith, Kalamazoo, Mich., assignor to The Upjohn Company, kalamazoo, Mich.**

**Division of Ser. No. 657,739, Feb. 13, 1976, Pat. No. 4,029,681. This application Mar. 7, 1977, Ser. No. 776,551**
**Int. Cl.[2] C07C *177/00***
**U.S. Cl. 560—121** **67 Claims**

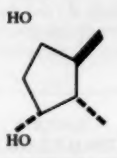
1. A prostaglandin analog of the formula:



wherein D is

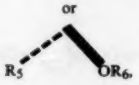


or



wherein $Y_1$ is $—C\equiv C—$;
wherein g is one, two, or 3;
wherein m is one to 5, inclusive;
wherein $M_1$ is

or



wherein $R_5$ and $R_6$ are hydrogen or methyl, with the proviso that one of $R_5$ and $R_6$ is methyl only when the other is hydrogen;
wherein $L_1$ is

or a mixture of

and

wherein $R_3$ and $R_4$ are hydrogen, methyl, or fluoro, being the

same or different, with the proviso that one of $R_3$ and $R_4$ is fluoro only when the other is hydrogen or fluoro;

wherein $R_1$ is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, two, or three chloro or alkyl of one to 3 carbon atoms, inclusive, or a pharmacologically acceptable cation.

---

## 4,147,880
## AGE RESISTERS AND AGE RESISTANT POLYMERIC COMPOSITIONS

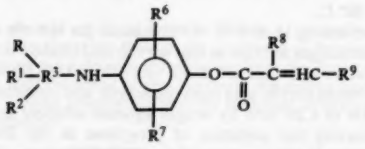
**Richard H. Kline, Cuyahoga Falls, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Division of Ser. No. 153,449, Jun. 15, 1971, Pat. No. 3,953,411. This application Sep. 22, 1975, Ser. No. 615,269**

**Int. Cl.²** C07C *67/08*

**U.S. Cl. 560—142** **5 Claims**

2. A compound having the following structural formula:



wherein $R^3$ is an aryl radical, R and $R^1$ are selected from the group consisting of hydrogen, alkyl radicals having from 1 to 4 carbon atoms and alkoxy radicals having from 1 to 4 atoms, $R^2$ is selected from the group consisting of hydrogen, alkyl radicals having from 1 to 4 carbon atoms, alkoxy radicals having from 1 to 4 carbon atoms and a radical having the following structural formula:

wherein $R^4$ is selected from the group consisting of alkyl radicals having from 1 to 12 carboms, cycloalkyl radicals having from 5 to 12 carbon atoms, aryl radicals having from 6 to 12 carbon atoms and aralkyl radicals having from 7 to 13 carbon atoms, $R^5$ is selected from the group consisting of hydrogen and alkyl radicals having from 1 to 12 carbon atoms and wherein $R^6$ and $R^7$ are selected from the group consisting of hydrogen and alkyl radicals having from 1 to 4 carbon atoms, wherein $R^8$ and $R^9$ are selected from the group consisting of hdrogen and alkyl radicals having from 1 to 4 carbon atoms.

---

## 4,147,881
## TETRABROMOXYLYLENE DIACRYLATES AND SUBSTITUTED ACRYLATES

**Georg Blumenfeld, St. Augustin; Egon N. Petersen, Neunkirchen; Hermann Richtzenhain, Much-Schwellenbach; Wilhelm Vogt, Cologne, and Norbert Vollkommer, Troisdorf, all of Fed. Rep. of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf Bez. Cologne, Fed. Rep. of Germany**

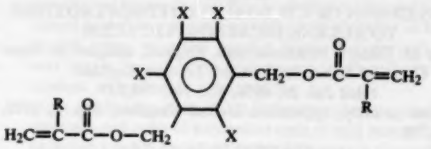
**Filed Aug. 19, 1976, Ser. No. 715,954**

**Claims priority, application Fed. Rep. of Germany, Oct. 1, 1975, 2543722**

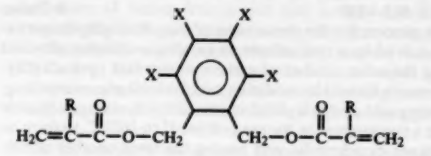
**Int. Cl.²** C07C *89/54*

**U.S. Cl. 560—221** **4 Claims**

1. Tetrahaloxylylene diester of formula 1 and tetrahaloxylylene diester of formula 2:



(1)



(2)

wherein R = hydrogen or a methyl group, and each X is bromo or chloro and at least three of the X's are bromo.

---

## 4,147,882
## ORGANIC ACIDS AND PROCESS FOR PREPARING SAME

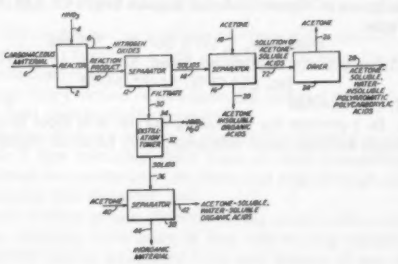
**Johann G. D. Schulz, Pittsburgh, and Edward T. Sabourin, Allison Park, both of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.**

**Continuation-in-part of Ser. No. 696,752, Jun. 16, 1976, Pat. No. 4,052,448. This application Jul. 5, 1977, Ser. No. 812,829**

**The portion of the term of this patent subsequent to Oct. 4, 1994, has been disclaimed.**

**Int. Cl.²** C07C *51/33*

**U.S. Cl. 562—410** **8 Claims**



1. A process for converting a carbonaceous material selected from the group consisting of coal and lignite to a mixture of polycyclic aromatic polycarboxylic acids that is insoluble in acetone and insoluble in water which comprises subjecting an aqueous slurry containing said carbonaceous material in particulate form and from about 50 to about 90 weight percent water to oxidation with aqueous nitric acid, having a concentration of about five to about 90 percent, the reaction mixture being maintained at a temperature of about 15° to about 200° C. for about 0.5 to about 15 hours, mechanically separating the solids in the resulting slurry, extracting the resulting solids with a polar solvent to obtain an acetone-soluble fraction and an acetone-insoluble fraction, and then recovering said acetone-insoluble fraction as said mixture of polycyclic aromatic polycarboxylic acids.

4,147,883

## CONVERSION OF CYCLOALKYLHYDROPEROXIDES TO ALKANE DICARBOXYLIC ACIDS

Arthur H. Gilbert, Middlesbrough, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Jul. 26, 1976, Ser. No. 708,737

Claims priority, application United Kingdom, Sep. 1, 1975, 35946/75

Int. Cl.[2] C07C *51/24, 55/14*

U.S. Cl. 562—523 6 Claims

1. A process for the conversion of a cycloalkylhydroperoxide dissolved in a cycloalkane to an alkane dicarboxylic acid having the same number of carbon atoms, said cycloalkylhydroperoxide formed by oxidizing said cycloalkane, comprising:

treating said cycloalkylhydroperoxide with nitrogen dioxide at a temperature in the range from 5° to 100° C. to form an alkane dicarboxylic acid having the same number of carbon atoms as said cycloalkylhydroperoxide.

---

4,147,884

## LIQUID PHASE OXIDATION OF UNSATURATED ALDEHYDES TO CORRESPONDING ACIDS

Ming N. Sheng, and Jar-Lin Kao, both of Cherry Hill, N.J., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Continuation-in-part of Ser. No. 600,174, Jul. 29, 1975, abandoned. This application Apr. 26, 1976, Ser. No. 679,958

Int. Cl.[2] C07C *51/32, 57/04*

U.S. Cl. 562—533 15 Claims

1. In a liquid phase oxidation process for oxidizing an $\alpha,\beta$-ethylenically unsaturated lower aliphatic aldehyde in an organic solvent to the corresponding unsaturated carboxylic acid by contacting said aldehyde with an oxygen-containing gas, the improvement of conducting the oxidation in the presence of a fluorine-containing organic solvent containing from 1 to about 18 carbon atoms that is in the liquid phase during the oxidation reaction.

---

4,147,885

## PROCESS FOR PRODUCING ACRYLIC ACID FROM PROPYLENE

Noboru Shimizu, Takatsuki; Isao Yanagisawa, Ikeda; Masahiro Takata, Tatsuno, and Takahisa Sato, Himezi, all of Japan, assignors to Nippon Shokubai Kagaku Kogyo Co. Ltd., Osaka, Japan

Filed Mar. 7, 1977, Ser. No. 775,286

Claims priority, application Japan, Mar. 11, 1976, 51-25602

Int. Cl.[2] C07C *51/32, 57/04*

U.S. Cl. 562—535 8 Claims

1. In a process for producing acrylic acid from propylene through acrolein as an intermediate by catalytic vapor phase oxidation by the steps of passing a starting reactant gas mixture containing 3 to 9% by volume of propylene, 1.6 to 4.0 moles, per mole of propylene, of molecular oxygen and steam through a first-stage reactor packed with an acrolein-selective catalyst containing at least molybdenum, bismuth and iron in an oxidic form, said catalyst capable of providing a conversion of propylene to acrolein of at least 80 mole% and a total one-pass yield of acrolein and acrylic acid of at least 70 mole% at a bath temperature of 250° to 450° C. and a residence time of 1.0 to 7.2 seconds; passing the resulting acrolein-containing gas through a second-stage reactor packed with a catalyst containing at least vanadium and molybdenum in an oxidic form, said catalyst providing a one-pass yield of acrylic acid, based on propylene fed, of at least 70 mole% at a bath temperature of 180° to 350° C. and a residence time of 1.0 to 7.2 seconds; introducing the resulting acrylic acid-containing gas to an acrylic acid collector to recover acrylic acid in the form of an aqueous solution; and incorporating a part of the exhaust gas from the collector into the starting reactant gas mixture; the improvement which comprises,

maintaining the tower top temperature of the acrylic acid collector from which the exhaust gas is discharged at 35° to 80° C.;

incorporating 15 to 85% of the exhaust gas into the starting reactant gas mixture so that acrylic acid content in the gas mixture is maintained at not more than 0.5% by volume;

recovering acrylic acid from the acrylic acid collector in the form of a 20–70% by weight aqueous solution; and

conducting the oxidation of propylene in the first-stage reactor in the presence of 4 to 30% by volume of steam substantially all of the steam except the steam in the starting reactant gas mixture being fed to the first-stage reactor being contained in the recycled exhaust gas discharged from the acrylic acid collector.

---

4,147,886

## PROCESS FOR THE PREPARATION OF ETHYNYL-$\beta$-IONOL

Hermann Wiederkehr, Flüh, Switzerland, assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Jun. 21, 1977, Ser. No. 808,509

Claims priority, application Switzerland, Jul. 15, 1976, 9084/76

Int. Cl.[2] C07C *29/00*

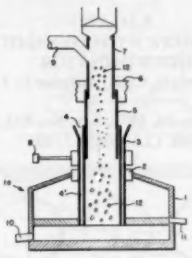
U.S. Cl. 568—824 2 Claims

1. A process for the preparation of ethynyl-$\beta$-ionol which comprises reacting $\beta$-ionone with acetylene in the presence of an alkali metal hydroxide in liquid ammonia at a temperature between about $-40°$ and about $+30°$C.

## 4,147,887
## ELECTRIC SMELTING FURNACE

**Shozo Yasukawa, Yokosuka, and Kenji Matsuda, Matsudo, both of Japan, assignors to Ishikawajima-Harima Jukogyo Kabushiki Kaisha, Tokyo, Japan**

**Continuation-in-part of Ser. No. 602,137, Aug. 5, 1975, abandoned. This application Jul. 20, 1977, Ser. No. 817,259**
**Int. Cl.[2] H05B *7/107***
**U.S. Cl. 13—18 B** **10 Claims**



1. An electric smelting furnace having a vertically positioned hollow electrode therein, the lower end of the electrode being spaced a predetermined distance from the furnace bottom, the wall thickness of the electrode depending upon the depth of current penetration into the electrode as determined by the equation:

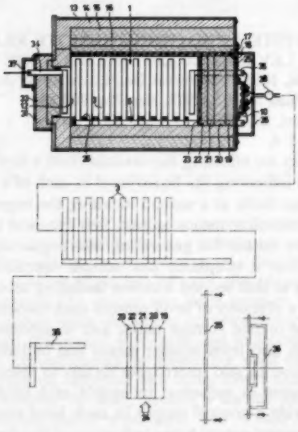
$$\delta \simeq 5030 \sqrt{\rho/\mu f\,(\text{cm})}$$

$\rho$:Specific resistance of the electrode (Ω-cm)
$\mu$:Specific permeability of the electrode
f:Frequency, cycles per second, and conduit means for discharging furnace off-gases and for charging raw materials into the furnace through said hollow electrode, said gases serving to pre-heat the raw materials.

## 4,147,888
## ELECTRIC HEATING ELEMENT FOR ELECTRIC RESISTANCE FURNACES

**Seiki Sato, 5-984 Negishi, Asaka-shi, Saitama-ken, Japan**

**Filed Jul. 20, 1977, Ser. No. 817,425**
**Int. Cl.[2] H05B *3/00***
**U.S. Cl. 13—22** **4 Claims**



1. An electric heating element for an electric heating furnace, comprising:

a plurality of parallel and regularly spaced heater frames each comprised of stright segments of conductive electric resistance heater strip stock having a polygonal cross section, each heater frame having a pair of ends, and said plurality of heater frames being relatively adjacently positioned to define a space heated by said plurality of heater frames when electrical current flows therethrough, and said heater frames being positioned to define the heating element as having an open portion;

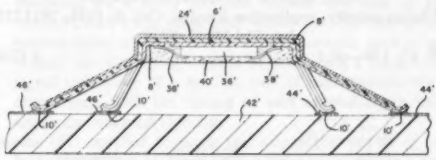
straight conductive connecting rods respectively connecting alternate end pairs of successive ones of said heater frames to define a series electrically conductive path through said plurality of heater frames and said straight conductive connecting rods, said straight conductive connecting rods being positioned perpendicular to the respective heater frames to which they are connected, and said heater frames and said straight conductive connecting rods having dimensions sufficient to define a rigid self-supporting heating element sufficiently rigid to maintain its shape during heating in use without additional support structure; and

a conductive rod extending from one end of the electric heating element and terminating adjacent another end of the electric heating element for defining a power input terminal pair of the electric heating element.

## 4,147,889
## CHIP CARRIER

**Daniel M. Andrews, San Marcos, Calif.; Joseph F. Merlina, Harrisburg, Pa.; John P. Redmond, Mechanicsburg, Pa.; William S. Scheingold, Paimyra, Pa., and George Ulbrich, Harrisburg, Pa., assignors to AMP Incorporated, Harrisburg, Pa.**

**Filed Feb. 28, 1978, Ser. No. 882,300**
**Int. Cl.[2] H05K *7/20***
**U.S. Cl. 174—52 FP** **4 Claims**



1. A chip carrier having a chip carrier base and a plurality of electrical leads carried on a first surface of said base, the improvement comprising:

said base being formed of thin dielectric material shaped in a recessed chip receiving receptacle,

said first surface on a bottom of said receptacle being coated with a first relatively thick layer of heat transmitting material for conducting heat from said chip through said relatively thin dielectric, and

a second surface of said dielectric being coated with a second relatively thick layer of heat transmitting material, whereby heat is transferred from said bottom of said receptacle through said relatively thin dielectric and to said second layer of heat transmitting material.

## 4,147,890
## HIGH VOLTAGE OVERHEAD ELECTRICAL TRANSMISSION CABLE PROTECTED FROM WET ENVIRONMENT CORONA LOSSES

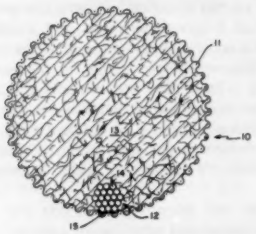
**Mario Rabinowitz, Menlo Park, and Frank S. Young, Los Altos, both of Calif., assignors to Electric Power Research Institute, Inc., Palo Alto, Calif.**

**Filed Dec. 27, 1977, Ser. No. 864,198**
**Int. Cl.[2] H01B *7/30***
**U.S. Cl. 174—127** **8 Claims**

1. A high voltage overhead electrical transmission cable protected from wet environment corona losses, comprising:

(a) an electrical conductor,

(b) a water-permeable electrically conductive jacket of substantially larger radius of curvature than said electrical conductor and disposed to surround said conductor along its axis and in electrical contact therewith, at least a portion of said jacket being radially spaced from said conductor forming a chamber therebetween, and




(c) a layer of water sorbent material disposed in said chamber, said sorbent material being capable of sorbing and retaining at least ten times its dry weight of water, and being selected from the group consisting of a water-swellable and insoluble gel-forming polymer and a molecular sieve material.

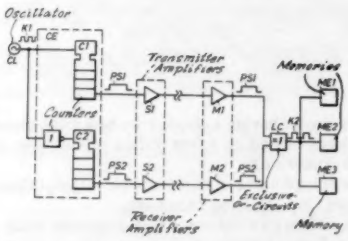
---

**4,147,891**

## ARRANGEMENT FOR DISTRIBUTION OF CLOCK SIGNALS

**Sture G. Roos, Bergshamra, Sweden, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden**

**Filed Sep. 21, 1977, Ser. No. 835,137**
**Claims priority, application Sweden, Oct. 8, 1976, 7611223**
**Int. Cl.[2] H04L 7/00**
**U.S. Cl. 178—69.1** **1 Claim**




1. An arrangement for transmission and reception of a plurality of clock signals in order to obtain well-defined pulses derived from said clock signals for control of logical circuits placed remote from a clock pulse source comprising on the sender side,

a clock pulse generating means for generating clock pulses,

counting means connected to said clock pulse generating means, said counting means receiving said clock pulses and producing at least two pulse signals, said pulse signals being phase displaced with respect to each other, the width of the pulses of said pulse signals being a multiple of the width of the pulses of said clock pulses, and the phase displacement between said at least two pulse signals corresponds to half the length of one cycle of the pulses of said clock pulses, the frequency of said at least two pulse signals being lower than the frequency of said clock pulses,

transmitting means for each of said at least two pulse signals for transmitting each pulse signal on a line,

and on the receiver side;

receiving means corresponding to each of said at least two pulse signals for receiving the pulse signals transmitted through the line,

logical means, connected to the receiving means, for detecting the transmitted pulse signals which are phase displaced with respect to each other, and in dependence on a defined ratio between the amplitudes of the at least two pulse signals, producing said well-defined pulses when said defined ratio exists.

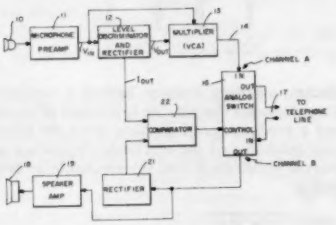
---

**4,147,892**

## SPEAKERPHONE WITH DYNAMIC LEVEL DISCRIMINATOR

**Eric M. Miller, Sunnyvale, Calif., assignor to Tridar, Los Altos, Calif.**

**Filed Jan. 30, 1978, Ser. No. 873,142**
**Int. Cl.[2] H04M 1/60**
**U.S. Cl. 179—1 HF** **3 Claims**




1. A speakerphone having a microphone channel, a speaker channel, and switching means for alternately connecting such channels to a communications link comprising: means for sensing peaks of an audio signal in said microphone channel; means for averaging said peaks; differential means for indicating peaks which are greater than said average; a comparator included in said switching means responsive to said differential means indication of said peaks being greater than said average in said microphone channel for connecting such channel to said link; means responsive to peaks less than said average for rapidly reducing the average value whereby under normal speaking conditions said peaks are greater than said average.

---

**4,147,893**

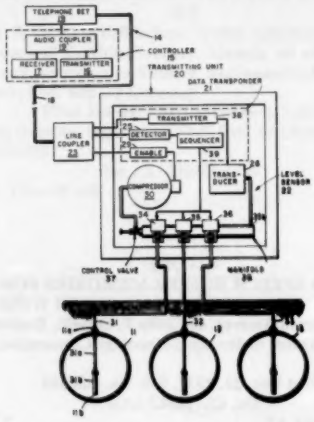
## GAUGING SYSTEM PROVIDING REMOTE READOUT OF LIQUID LEVELS IN GASOLINE STORAGE TANKS

**Carl G. Matson, 10953 Rivercrest Dr., Little Rock, Ark. 72212**

**Filed May 5, 1978, Ser. No. 903,196**
**Int. Cl.[2] H04M 11/00; G01F 23/14**
**U.S. Cl. 179—2 A** **17 Claims**

1. In a system for effecting the readout from a first location of information indicating the liquid level in each of a plurality of liquid storage tanks at a second location; the improvement comprising: controller means at said first location including first transmitter means for generating interrogate signals for transmission over a telephone link to said second location, readout means at said second location including level sensing means having a plurality of level sensors each associated with a different one of said storage tanks, and transponder means associated with said level sensing means and including select means responsive to said interrogate signals to select each of said level sensors in sequence to enable said level sensing means to provide a control output as each level sensor is selected, each control output being indicative of the depth of the liquid in the storage tank associated with the selected level sensor, and second transmitter means responsive to each control output to generate an information signal related in frequency to the depth of the liquid in the tank associated with the selected level sensor for transmission over said telephone link

to said first location; said controller means further including receiving means for receiving said information signal and




providing an output indicative of the depth of the liquid in the storage tank associated with the selected level sensor.

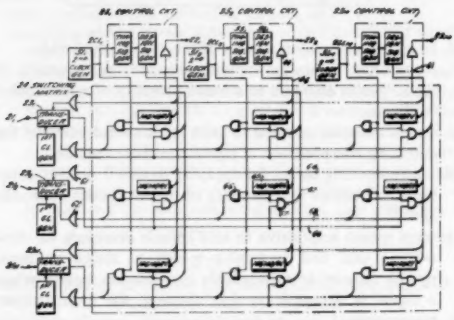
---

**4,147,894**

## TIME DIVISION MULTIPLEX COMMUNICATION DEVICE COMPRISING A SWITCHING MATRIX BETWEEN C/E BUFFERS AND CONTROL CIRCUITS

**Yoshio Watanabe, Yokosuka, and Akio Saburi, Tokyo, both of Japan, assignors to Nippon Telegraph & Telephone Public Corp. and Nippon Electric Co., Ltd., both of Tokyo, Japan**

**Filed Sep. 26, 1977, Ser. No. 836,666**
**Claims priority, application Japan, Oct. 8, 1976, 51-121088**
**Int. Cl.[2] H04J *3/00***
**U.S. Cl. 179—15 A** **10 Claims**



**1.** In a time division multiplex communication device for carrying out conversion between a preselected portion of each of a plurality of first signal sequences of a first rate, N in number, and a prescribed portion of each of a plurality of second signal sequences of a second rate, M in number, in response to both first clock pulse sequences corresponding to respective ones of said first signal sequences and to second clock pulse sequences corresponding to respective ones of said second signal sequences, said first rate being lower than said second rate, the number N being greater than the number M, the preselected portion of a pertinent one of said first signal sequences being an expansion with respect to time of the prescribed portion of a relevant one of said second signal sequences, the prescribed portions of said second signal sequences being determined as a function of the timing of said second clock pulse sequences, a combination which comprises:

a plurality of first device terminals **(21)** equal in number to the number of said plurality of first signal sequences, each of said first device terminals for receiving a respective one of said first signal sequences;

a plurality of second device terminals **(22)** equal in number of the number of said plurality of first signal sequences, each of said second device terminals for receiving a respective one of said second signal sequences;

a plurality of transducers **(23)** equal in number to the number of said plurality of first signal sequences, each of said transducers having a first and a second transducer terminal and a control terminal, said first transducer terminal of each said transducer being connected to a respective one of said first device terminals whereby each of said transducers is associated with a respective one of said first signal sequences, each of said transducers being capable of performing a conversion between a preselected portion of its associated said first signal sequence and a prescribed portion of that one of said second signal sequences which appears at the second transducer terminal thereof, each of said transducers carrying out said conversion in response to both that one of said first clock pulse sequences which corresponds to said first signal sequence associated therewith and to a control signal comprising a first and a second part and suppied to said control terminal thereof;

a plurality of control circuits **(25)** equal in number to the number of said plurality of second signal sequences, each of said control circuits having a plurality of first circuit terminals, said first circuit terminal of each of said control circuits being coupled to each of said transducers, and a second circuit terminal, said second circuit terminal of each said control circuits being connected to a respective one of said second device terminals whereby each of said control circuits is associated with a different one of said second signal sequences, each of said control circuits receiving on a third terminal thereof that one of said second clock pulse sequences which corresponds to said second signal sequences associated therewith, each of said control circuits being capable of producing a designation signal indicative of a specific one of said transducers in compliance with the timing of said second clock pulse sequence received thereby;

means **(61)** coupled between said control terminals of said transducers and said control circuits for supplying each designation signal to the control terminal of the transducer specified thereby as said first part of said control signal;

enabling means **(65)** connected to said control circuits for producing an enabling signal in response to said designation signal;

first means connected to said enabling means and to said control terminals of each of said transducers for supplying, in response to said enabling signal, the second clock pulses of said second clock pulse sequence which is associated with the said control circuit which produced said designation signal to the control terminal of said transducer indicated by said designation signal as said second part of said control signal; and

second means **(67)** connected to said enabling means, said second transducer terminals of each of said transducers, and said first circuit terminals of each of said control circuits for transmitting, in response to said enabling signal, the prescribed portion of said second signal sequence associated with said transducer indicated by said designation signal between said second transducer terminal of said transducer indicated by said designation signal and said first circuit terminal of a said control circuit which produced said designation signal;

each of said control circuits comprising transfer means **(49)** between the first circuit terminals thereof and the second circuit terminal thereof for transferring therebetween the prescribed portion of the second signal sequence appearing at the second circuit terminal thereof, the transfer means of said control circuit thereby transferring the prescribed portion of said pertinent second signal se-

quence between the first circuit terminal thereof and the second circuit terminal thereof.

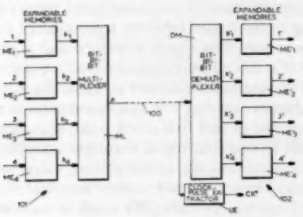
---

**4,147,895**

## EXPANDABLE MEMORY FOR THE SUPPRESSION OF PHASE JITTER IN A TELECOMMUNICATION SYSTEM

**Francesco Fenoglio, Milan, Italy, assignor to Societa Italiana Telecomunicazioni Siemens S.p.A., Milan, Italy**

**Filed Dec. 21, 1977, Ser. No. 862,670**
**Claims priority, application Italy, Dec. 23, 1976, 30815 A/76**
**Int. Cl.[2] H04J 3/06**
**U.S. Cl. 179—15 AF** **8 Claims**



1. In a telecommunication system wherein a transit station receives an incoming bit stream forming a succession of frames, with a predetermined average bit cadence subject to random variations due to the presence of stuffing bits in certain of said frames accompanied by discriminating bits indicative of the presence of said stuffing bits, for retransmission over an outgoing signal path with a substantially uniform bit rate after interim storage in an expandable memory,

the improvement wherein said expandable memory comprises:

register means with n stages for the temporary storage of n consecutive incoming bits;

writing-control means including a first n-pulse counter stepped by a train of first clock pulses extracted from said bit stream for timing the recurrent sequential loading of said stages at a rate corresponding to the instantaneous mean cadence of said incoming bits;

a detector for said discriminating bits;

inhibiting means upstream of said writing-control means for suppressing a first clock pulse in a time position allocated to a stuffing bit under the control of said detector;

local pulse-generating means with an adjustable operating frequency of the order of said predetermined cadence producing a train of second clock pulses;

reading-control means including a second n-pulse counter stepped by said train of second clock pulses for timing the recurrent sequential unloading of said stages at a rate substantially corresponding to said instantaneous mean cadence; and

synchronizing means for continuously adjusting said operating frequency to maintain said reading-control means substantially in step with said writing-control means, said synchronizing means including a phase comparator with inputs connected to said writing-control means and to said reading-control means for feeding back a control signal to said pulse-generating means, said phase comparator including a flip-flop with a first input connected to said first counter for receiving therefrom a first monitoring pulse on every $n^{th}$ first clock pulse and with a second input connected to said second counter for receiving therefrom a second monitoring pulse on every $n^{th}$ second clock pulse but with an offset of approximately n/2 clock pulses relative to said first monitoring pulse, said flip-flop being settable by one of said monitoring pulses and resettable by the other of said monitoring pulses for generating a square wave with a 50% duty ratio upon exact interleaving of successive first and second monitoring pulses, said synchronizing means further including an integrating stage fed by said flip-flop for deriving said control signal from the square wave.

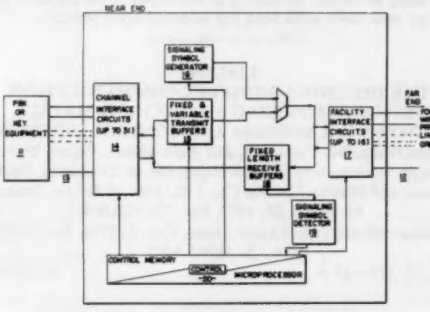
---

**4,147,896**

## FIXED SPEECH BUFFER MEMORIES FOR SIGNALLING WITHOUT AN ORDER WIRE

**Thomas B. Cannon, Denver, and John F. O'Neill, Boulder, both of Colo., assignors to Storage Technology Corporation, Louisville, Colo.**

**Filed Dec. 23, 1977, Ser. No. 863,890**
**Int. Cl.[2] H04J 5/00**
**U.S. Cl. 179—15 AS** **7 Claims**



1. In a communication system of the type comprising:

first switching means for applying signals from a plurality of input speech channels to a lesser plurality of transmission facilities;

a speech detector coupled to each input speech channel for detecting the presence of signals on that channel;

second switching means for applying signals from said transmission facilities to a plurality of output speech channels; and

control means responsive to said speech detectors for controlling said first switching means to assign an input speech channel to an available transmission facility when a signal is detected on that channel, the improvement comprising:

a symbol generator actuated by said control means for generating a symbol identifying the speech channel to which the transmission facility has been assigned;

a fixed delay between each input speech channel and said first switching means, said symbol being applied to the assigned transmission facility before said signal and during the interval of said fixed delay;

a symbol detector at said remote location connected to said second switching means to enable control of the connection of the assigned transmission facility to the output speech channel indicated by the detected symbol; and

a fixed delay between each transmission facility and said second switching means, said fixed delay providing a time interval in which the symbol detection and switching takes place.

4,147,897

## CIRCUIT FOR TELEPHONE AUXILIARY EXCHANGES HAVING DELAYED CONNECTION OF A BUSY SIGNAL SET

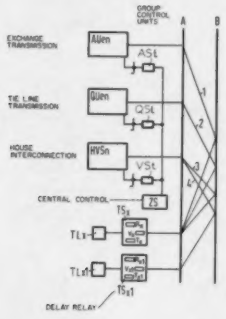
Norbert Springer, Taufkirchen; Walter Oberhauser, Wolfratshausen, and Joachim Sommer, Munich, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Jul. 21, 1977, Ser. No. 817,567

Claims priority, application Fed. Rep. of Germany, Jul. 26, 1976, 2633515

Int. Cl.[2] H04Q *3/00*

U.S. Cl. 179—18 AB 1 Claim




1. In a telecommunications exchange system in which, in response to a release signal produced as a result of a subscriber station releasing an existing connection, a connection set of the system seized for that connection is immediately released, in which the system includes internal connection sets, and in which a central control device of the system establishes an intercept state engaging the subscriber circuit of another subscriber station involved in that connection and not yet released, the improvement therein comprising:

delay means in said subscriber circuit; and

switching means in said subscriber circuit connected to said delay means and operable in response to the establishment of the intercept state, delayed by said delay means, to send call signals to the central control device which is responsive to the call signals to establish a connection of the subscriber circuit to a free internal connection set of the system, as would normally be the case in an outgoing seizure of the subscriber circuit, for connection of a busy signal instead of dial tone to the subscriber circuit not yet released via the just-connected internal connection set.

---

4,147,898

## RECORDING AND/OR REPRODUCING APPARATUS MODE CONTROL SYSTEM

Toshimasa Tozune, Kawaguchi, and Hisashi Hanzawa, Tokyo, both of Japan, assignors to Sony Corporation, Tokyo, Japan

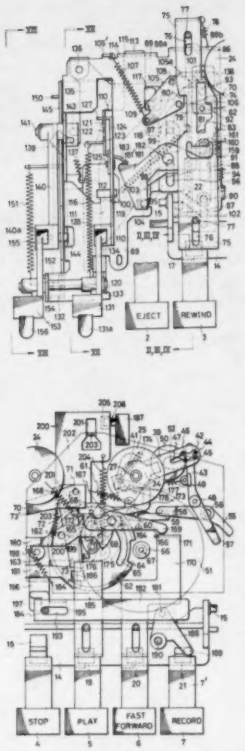
Filed Mar. 10, 1977, Ser. No. 776,176

Claims priority, application Japan, Mar. 12, 1976, 51-27284

Int. Cl.[2] G11B *15/32, 31/00*

U.S. Cl. 179—100.11 12 Claims

1. A tape recording and/or reproducing apparatus having reel mounts, for respectively supporting supply and take-up reels for a recording medium including means associated with one of said reel mounts for detecting stoppage of the reel mount as a result of all of the recording medium being wound on one of said reels; selectively operable change-over means for conditioning said apparatus to operate in an automatic shut-off, automatically rewind, or automatically repeat mode when the stoppage of said one reel mount is detected; and operating means for selectively placing said apparatus in a stop, record, play, rewind or fast forward mode to transport the recording medium from one reel to another and including control means responsive to said detecting means and said change-over means for controlling said operating means to place said apparatus in the operating mode selected by said change-over means when the detecting means detects stoppage




of said one reel mount, and means for preventing change-over of said change-over means into the automatic rewind or automatic repeat operations when the play push button of the apparatus is not depressed.

---

4,147,899

## BROADBAND ELECTROMAGNETIC SOUNDSOURCE WITH DIFFERENTLY TUNED DIAPHRAGMS

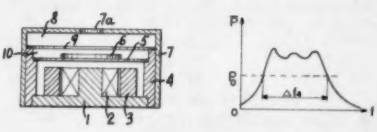
Shigeo Mori; Fumikazu Murakami; Yoshiaki Hara; Ichiro Horikoshi, and Sohya Takahashi, all of Tokyo, Japan, assignors to Kabushiki Kaisha Daini Seikosha, Japan

Filed Sep. 1, 1977, Ser. No. 829,963

Claims priority, application Japan, Sep. 1, 1976, 51-104708

Int. Cl.[2] H04R *1/24, 11/00*

U.S. Cl. 179—116 2 Claims




1. An electroacoustic transducer comprising a first vibrating plate, a second vibrating plate spaced from said first vibrating plate, an armature of soft magnetic material secured to the first only of said vibrating plates, electrically driven means acting magnetically on said armature for vibrating said first vibrating

plate, means interconnecting peripheral portions of said first and second vibrating plates to provide between said plates an airtight space comprising an air-spring coupling said second vibrating plate with said first vibrating plate whereby vibration of said first vibrating plate is transmitted by said air-spring to said second vibrating plate, said first vibrating plate being driven by said electrically driven means and said second vibrating plate being driven by said air-spring, said first and second vibrating plates coupled by said air-spring comprising a vibration system having two resonant frequencies, and a resonant air chamber superposed on said second vibrating plate which forms a wall of said chamber, said resonant air chamber having a sound radiating port.

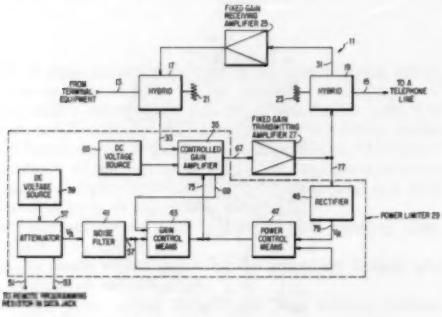
---

**4,147,900**

## TELEPHONE NETWORK PROTECTIVE COUPLER

**Mauro L. Gaetano, Woodbridge, Va., and Ambroz K. Skrovanek, Bethesda, Md., assignors to Harvey Hubbell Incorporated, Bridgeport, Conn.**

**Filed Apr. 7, 1977, Ser. No. 785,680**
**Int. Cl.[2] H04B *3/08***
**U.S. Cl. 179—170 R** **36 Claims**




**23**. A telephone network protective coupler for connect-terminal equipment to a central office by means of a telephone line comprising:

a four-wire transmission network including noncoincident receive and transmit paths for respectively receiving a.c. signals from and transmitting a.c. signals to the central office,

a controlled gain amplifier connected in the transmit path for varying the attenuation of a.c. signals transmitted to the central office;

an attenuator disposed externally of the transmit path and having an attenuation set to a predetermined value;

means for connecting the attenuator to a d.c. voltage source;

a rectifier disposed externally of the transmit path for rectifying a.c. signals after passage through the amplifier; and

maximum power control means connected to the rectifier and to the attenuator for keeping the ratio of the amplitude of the rectified a.c. signals to the output voltage of the attenuator less than or substantially equal to a fixed constant and further connected to said amplifier for controlling the gain thereof.

---

**4,147,901**

## RELAY MARGIN TEST SET

**Orrin B. O'Dea, Garden Grove, Calif., assignor to Communication Mfg. Company, Long Beach, Calif.**

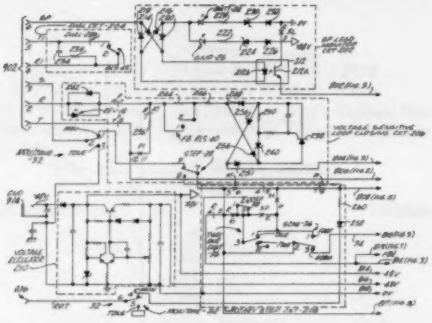
**Division of Ser. No. 757,625, Jan. 7, 1977, Pat. No. 4,095,058. This application Dec. 12, 1977, Ser. No. 859,739**
**Int. Cl.[2] H04M *3/24***
**U.S. Cl. 179—175.2 R** **2 Claims**

**1**. A telephone system test apparatus for a telephone switching system having tip and ring circuits which cause a control relay to close upon completion of a path therebetween and which cause the same relay to repeatedly open and close for providing forward dial pulses responsive to further completions of the path between such tip and ring circuits, comprising:

means for monitoring such a telephone system for detecting proper operating conditions therein and a non busy condition across such tip and ring circuits;

means for detecting a predetermined impedance condition across such tip and ring circuits;

a dial pulse loop circuit for coupling across such tip and ring circuits and normally having a high impedance;



means for selectively switching a first low impedance condition around said dial pulse loop circuit and thereby apply a margin test to such control relay;

means for opening and closing said dial pulse loop circuit one or more times for applying dial pulses across such tip and ring circuits and operating and releasing such control relay upon detection of such proper operating conditions and such non busy conditions; and

means for switching a second substantially lower impedance, than the first low impedance, around said dial pulse loop circuit intermediate openings of the dial pulse loop to thereby ensure proper operation of such control relay.

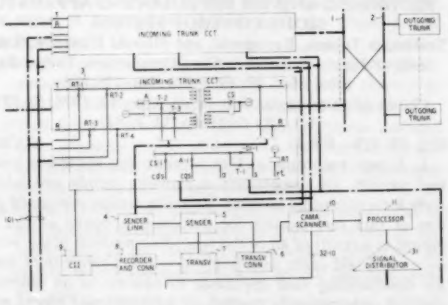
---

**4,147,902**

## METHOD OF AUTOMATIC TRUNK TESTING

**Francis S. Dworak, Oceanport, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Division of Ser. No. 678,689, Apr. 20, 1976. This application May 6, 1977, Ser. No. 794,371**
**Int. Cl.[2] H04M *3/22***
**U.S. Cl. 179—175.2 R** **2 Claims**




**1**. For use with a telephone switching system having a plurality of trunks and automatic message accounting equipment including means for normally scanning busy ones of said trunks to obtain a supervisory state information for call charging

purposes, the method of detecting a fraudulent telephone call comprising the steps of:

detecting, at said scanning means, the appearance of predetermined supervisory state sequences at any one of said plurality of trunks, and

responsive to said detecting, generating a special test control signal to indicate the likelihood of the presence of a fraudulent call on said trunk.

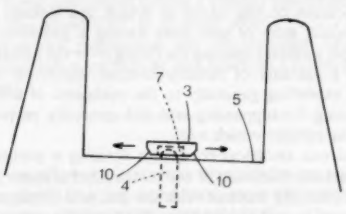
---

**4,147,903**

## TELEPHONE GUARD

**Richard T. Shpall, One Wilshire Blvd., Suite 2301, Los Angeles, Calif. 90017**

**Filed Nov. 7, 1977, Ser. No. 848,934**
**Int. Cl.[2] H04M *1/02***
**U.S. Cl. 179—178** **1 Claim**



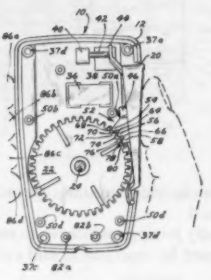

1. A guard for a telephone of the desk type having a housing with a first and second switch controlling plunger mounted moveably therein, a cradle portion of the housing acting to position the handset when resting in the cradle onto the switch plungers causing them to be depressed, thereby rendering the telephone ready for incoming calls, and a hand carrying recess the roof of which forms a portion of the cradle, said telephone guard comprising a base being rigidly attached to the roof of the hand carrying recess, and an arm being attached to the base, said arm which when manually moved from its normal position having spring action tending to return said arm to its normal position, and said arm which when in its normal position covers the first switch plunger thereby preventing it from rising fully even with the handset removed from the cradle thus rendering the telephone ready for incoming calls, said arm which when manually moved laterally from its normal position uncovers the first switch plunger allowing the switch plunger to rise thereby activating the telephone, wherein the portion of the arm which covers the switch plunger has a partial depth hole which admits the first switch plunger when the arm is in its normal position whereby the depth of the hole is sufficiently shallow to allow the switch plunger to rise to the top of the hole without activating the telephone, thereby with the handset removed from the cradle preventing the arm from being moved horizontally unless the second switch plunger is manually fully depressed allowing the first switch plunger to drop out of the partial depth hole, said arm when released after the switch plunger has risen springs back tending towards its normal position coming to rest against the side of the switch plunger, and when the handset is returned to the cradle depressing the top of the switch plunger to the level of the arm, said arm as a result of the spring action riding up and over the beveled edge of the first switch plunger returning to its normal position thereby automatically re-engaging the guard.

**4,147,904**

## MICROPHONE WITH CHANNEL SELECTOR AND PUSH-TO-TALK BUTTON INTERLOCK

**Michael P. Carpenter, Robbinsdale, and Paul M. D'Amico, Bloomington, both of Minn., assignors to Telex Communications, Inc., Minneapolis, Minn.**

**Filed Mar. 6, 1978, Ser. No. 883,372**
**Int. Cl.[2] H04R *1/02***
**U.S. Cl. 179—178** **10 Claims**



1. A microphone for use with two-way radio communications equipment having a push to talk function to activate equipment into the transmit mode of operation, said microphone comprising:

a. hollow housing means;

b. grill means positioned in an upper portion of said housing means and a microphone means positioned adjacent said grill means internal to said housing means;

c. spring actuated push to talk switch button means pivotally mounted in said housing means and having a portion extending through a slot in said housing means;

d. push to talk spring actuated plunger switch positioned internal to said housing means and having the plunger engaging against a portion of said push to talk switch button means;

e. channel selector means rotatably mounted in said housing means and having a portion extending through a slot is said housing means; and,

f. interlocking means operably engagable between said push to talk switch button means and channe selector means whereby when an operator depresses said push to talk switch button means into said housing means, said interlocking means lockably engages during transit mode of operation when said push to talk switch button means is depressed thereby preventing the switching of the channels during the transmit mode of operation.

---

**4,147,905**

## SLEEVE AND TERMINAL HOLDER ASSEMBLY FOR AN AXIAL SPLIT-PIN TUMBLER-TYPE SWITCH LOCK MECHANISM

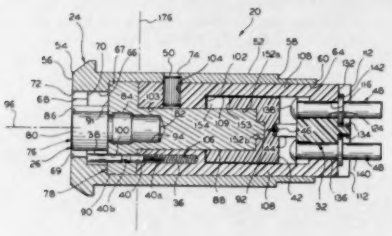
**Frank J. Scherbing, Chicago, Ill., assignor to Chicago Lock Co., Chicago, Ill.**

**Filed May 17, 1977, Ser. No. 797,624**
**Int. Cl.[2] H01H *9/28, 27/00***
**U.S. Cl. 200—44** **15 Claims**

1. A sleeve and terminal holder assembly for an axial split-pin tumbler-type switch lock mechanism, said lock mechanism including a lock cylinder, and an operating part disposed forwardly within said cylinder and rotatable about a longitudinal axis extending between front and rear ends of the part, said operating part including a cylindrical head and a shaft having a reduced diameter with respect to the head and extending rearwardly therefrom, said head having longitudinal tumbler bores extending therethrough and disposed radially outwardly of said shaft, said assembly comprising:

a sleeve adapted to be disposed within and fixedly secured to said cylinder adjacent to said operating part head and with

said shaft extending therethrough, said sleeve having longitudinal tumbler bores therein adapted for alignment with said head bores for receiving split-pin tumblers in aligned bores,



a holder for electrical terminals spaced rearwardly from said sleeve, and

means fixedly joining said sleeve to said holder in an assembly adapted for insertion in said cylinder as a unit.

---

**4,147,906**

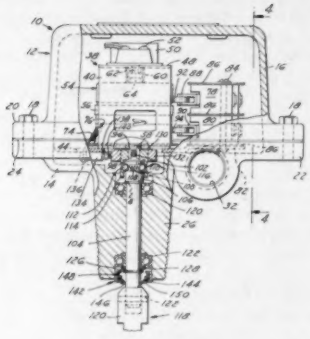
## ROTATION PADDLE BIN LEVEL INDICATOR

**Walter E. Levine, Port Huron, Mich., assignor to Bindicator Company, Port Huron, Mich.**

**Filed Nov. 7, 1977, Ser. No. 849,410**

**Int. Cl.[2] H01H** *35/00*

**U.S. Cl. 200—61.2** **7 Claims**



1. In an apparatus for indicating the level of material in a storage bin comprising a hollow enclosure including means extending from said enclosure adapted to engage a gland carried by a bin wall for mounting said apparatus to a bin, a motor mounted for limited rotation within said enclosure and having a motor housing and a drive shaft, a paddle adapted to be disposed for rotation within said bin, rotation of said paddle being retarded when material stored in said bin reaches the level of said paddle, means extending through said gland-engaging means driveably coupling said paddle to said motor drive shaft for rotating said paddle, and means mounted within said enclosure for detecting limited rotation of said motor when rotation of said paddle is retarded by material stored within said bin, the improvement wherein said motor is suspended within said enclosure by first means coupled to said shaft for preventing radial movement of said shaft and motor housing relative to said enclosure and spring means suspending relative to said enclosure an end of said motor housing remote from said shaft, said motor housing axially floating within said enclosure between said first means and said spring means.

**4,147,907**

## GAS LEAKAGE INDICATION DEVICE

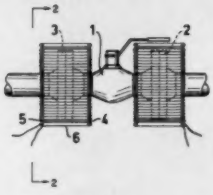
**Erwin Mündel, Linkoping, Sweden, assignor to Leif Tage Petersen, Sweden**

**Filed Mar. 29, 1977, Ser. No. 782,584**

**Claims priority, application Sweden, Mar. 31, 1976, 76038405**

**Int. Cl.[2] G01N** *27/12;* **H01H** *35/00*

**U.S. Cl. 200—61.03** **4 Claims**



1. In an electrically-operated gas leakage indicating system for detecting the leakage of gas from a tubular vessel and utilizing a closed electrical circuit through which current is flowing, a gas leakage sensing apparatus which comprises:

first and second disks protruding radially from the tubular vessel and spaced apart from one another so as to straddle a location on the vessel at which gas leakage is to be detected, each of said disks having a generally annular shape, a central opening for fitting over the tubular vessel, and a plurality of radially-directed selectively bendable tips extending generally to the perimeter of said central opening for supporting said disk generally perpendicular to the tubular vessel; and

at least one electrical conductor forming a portion of the closed electrical circuit and constructed of material which is chemically reactive with the gas, said conductor being secured to said spaced-apart disks radially outward of the tubular vessel, whereby leaking gas is directed by said disks radially outward toward said conductor so as to interrupt the electric current passing through said conductor.

---

**4,147,908**

## ELECTRIC SWITCHES

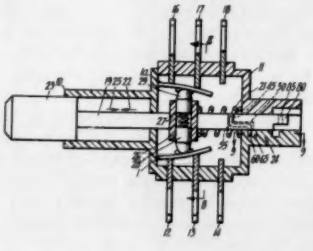
**David A. Swann, 17-21 Carinish Rd., Clayton, Victoria, Australia (3168)**

**Continuation of Ser. No. 634,174, Nov. 21, 1975, abandoned. This application Dec. 30, 1976, Ser. No. 755,584**

**Claims priority, application Australia, Nov. 25, 1974, 9740; Dec. 3, 1974, 9857**

**Int. Cl.[2] H01H** *13/28*

**U.S. Cl. 200—67 G** **10 Claims**



1. A contact bridging member for an electric switch of the type wherein a contact bridging member is slid by an actuator over a fulcrum and in so doing pivots thereabout to bring the leading end of the member into contact with, or the trailing end out of contact with, an electrical contact; said contact

bridging member comprising a unitary conductive piece having an integral abutment member adapted to be acted upon by the actuator in the aforesaid manner to effect said sliding; said abutment member comprising at least two tabs formed by partially severing the contact bridging member and bending resultant tabs outward from the contact bridging member to project from that side of the contact bridging member which, in use, is remote from said contact and fulcrum.

---

**4,147,909**

## SINTERED COMPOSITE MATERIAL AS CONTACT MATERIAL FOR MEDIUM-VOLTAGE VACUUM POWER CIRCUIT BREAKERS

**Heinrich Hässler, Wendelstein, and Horst Kippenberg, Nüremberg, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany**

**Filed Apr. 13, 1977, Ser. No. 787,005**

**Claims priority, application Fed. Rep. of Germany, May 3, 1976, 2619459**

**Int. Cl.[2] H01H *1/02***

**U.S. Cl. 200—265** **6 Claims**

1. In a material for use as a medium-voltage vacuum power circuit breaker in the switching voltage range of from about 7.2 kV to 36 kV, comprising a sintered composite of a burnoff-resistant metal component having a melting temperature in the range of from about 1083° C. to about 2000° C., and a breaking current-lowering component, the improvement comprising utilizing chromium carbide as said breaking current-lowering component.

---

**4,147,910**

## POWER ADJUSTMENT WITH VARIABLE FREQUENCY AND DUTY-CYCLE CONTROL FOR INDUCTION HEATING APPARATUS

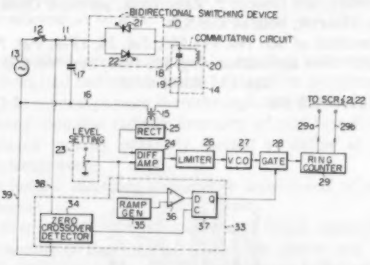
**Mitsuyuki Kiuchi; Takumi Mizukawa; Keizo Amagami, and Hirokazu Yoshida, all of Kadoma, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan**

**Filed Jun. 6, 1977, Ser. No. 803,968**

**Claims priority, application Japan, Jun. 4, 1976, 51/65900**

**Int. Cl.[2] H05B *5/04***

**U.S. Cl. 219—10.49 R** **5 Claims**




1. Induction heating cooking apparatus comprising: a solid state switching device, a commutating circuit including a work coil in circuit with said solid state switching device to receive power from a source of low frequency alternating energy, means for setting a desired power level, means for triggering said switching device at a high frequency in a preselected range in accordance with the setting of said desired power level when the setting power is within a higher range of power levels to thereby generate high frequency energy in said commutating circuit, and means for disabling said high frequency energy for periodic time intervals in accordance with the setting of said desired power level when said setting power is within a lower range of power levels.

**4,147,911**

## METHOD FOR SINTERING REFRACTORIES AND AN APPARATUS THEREFOR

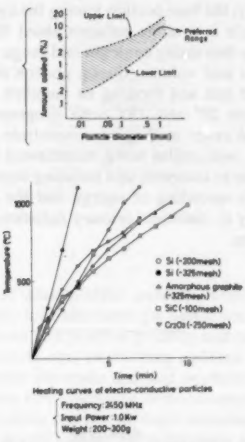
**Teruyuki Nishitani, Himeji, Japan, assignor to Nippon Steel Corporation, Tokyo, Japan**

**Filed Aug. 10, 1976, Ser. No. 713,148**

**Claims priority, application Japan, Aug. 11, 1975, 50/97268**

**Int. Cl.[2] H05B *9/03***

**U.S. Cl. 219—10.55 M** **3 Claims**




1. A method for sintering refractories which comprises mixing a group of dielectric refractory particles with 0.1 to 5% by weight of an electric conductor, in which the particle size of the electric conductor is not more than 10 times the skin depth of the conductor in the microwave region, forming the mixture and sintering the formed mixture thus obtained by means of microwave induction heating in a space surrounded by a metal wall.

---

**4,147,912**

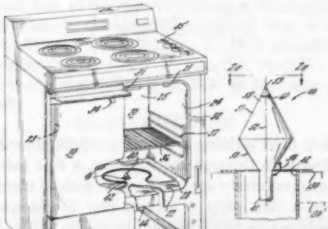
## SHAPED ANTENNA FOR ENERGY DISTRIBUTION IN A MICROWAVE COOKING CAVITY

**Frederick K. Uyeda, Attica, Ind., assignor to Roper Corporation, Kankakee, Ill.**

**Filed Feb. 7, 1977, Ser. No. 765,967**

**Int. Cl.[2] H05B *9/06***

**U.S. Cl. 219—10.55 F** **18 Claims**



1. In a microwave oven having a cooking cavity enclosing a predetermined volume within which a cooking load is to be located, a static monopole antenna for coupling energy to said cavity and distributing said energy within said volume, said antenna comprising a radiating member joining a cylindrical conductor, the antenna being positioned with the radiating

member in the cavity and the cylindrical conductor projecting through an aperture in a wall of said cavity, means for coupling microwave energy to said cylindrical conductor for distribution by said radiating member, the radiating member having a base portion joining said cylindrical conductor and a tip portion on said base portion, the radiating member being symmetrical with the axis of said cylindrical conductor, the radiating member having a substantially continuous outer surface shaped to be circular in planes perpendicular to the axis with the cross sectional areas of said planes being varied to guide the radiation of energy, the base portion joining the cylindrical conductor at an angle in a range between about 90° and 180° with progressively decreasing angles in said range tending to spread the energy in said volume, the tip portion merging toward a point on said axis and forming an included angle in a range between about 20° and 150° with progressively decreasing angles in said range tending to concentrate center energy in said volume, said angles being coordinated to said predetermined volume to comprise said radiating member as means for balancing the spreading of energy and the concentrating of center energy to distribute primary radiation in said predetermined volume.

---

**4,147,913**

## WELD GAP SHEARS FOR A FLASH WELDING MACHINE

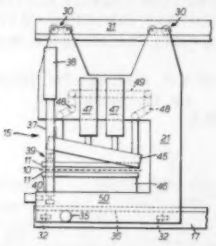
**John C. Clews, Dudley, and Austin G. Goodwin, Stourbridge, both of England, assignors to British Federal Welder & Machine Co. Limited, Dudley, England**

**Filed Apr. 4, 1977, Ser. No. 784,077**

**Claims priority, application United Kingdom, Apr. 7, 1976, 14028/76**

**Int. Cl.² B23K *11/04***

**U.S. Cl. 219—97** **5 Claims**



1. A strip flash welding machine comprising means defining a strip flow path through the machine, a first pair of clamps extending transversely across the flow path to clamp the trailing end of a steel strip, a second pair of clamps extending transversely across the flow path to clamp the leading end of another steel strip, the second pair of clamps being movable along the strip flow path relative to the first pair of clamps, means for supplying welding current to the pairs of clamps, and a guillotine shear unit aligned with the gap between the first and second pairs of clamps for shearing strip ends secured by the clamps, said shear unit comprising a C frame movable transversely into and out of the strip flow path, said frame having shear blades supported thereon, and support means engagable with ends of the C frame to interconnect same for shearing.

**4,147,914**

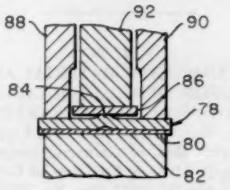
## METHOD FOR MAKING FRICTION BANDS

**Alexander S. Body, Livonia, Mich., assignor to D.A.B. Industries, Inc., Troy, Mich.**

**Filed Apr. 25, 1977, Ser. No. 790,257**

**Int. Cl.² B23K *11/14***

**U.S. Cl. 219—86.9** **6 Claims**




1. In a method of manufacturing a friction band comprising the steps of adhering a generally flat frictional lining strip to one surface of a generally flat metallic strip, then forming the adhered strips into a generally arcuate shape with the lining strip on the radially inner surface of the arc, then welding a bracket onto the radially outer surface of the metallic strip adjacent each free end thereof, the improvement in welding comprising the steps of punching radially outward projections in said metallic strip adjacent each free end thereof to form recesses on the radially inner side of each projection, locating said bracket in contact with said projections so as to leave a radially outer surface area on the metallic strip adjacent the bracket for placing electrode means, placing first electrode means in contact with an exterior portion of the bracket, placing second electrode means closely adjacent to the first electrode means in contact with said radially outer surface area of the metallic strip, then electrically energizing said electrode means so that an electrical current flows therebetween to cause welding of the bracket to the metallic strip and collapse of at least portions of said projections into said recesses.

---

**4,147,915**

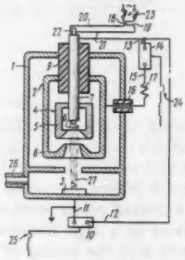
## ELECTRON-BEAM APPARATUS FOR THERMAL TREATMENT BY ELECTRON BOMBARDMENT

**Boris G. Sokolov, Nosovikhinskoe Shosse, 11, kv. 64, Zheleznodorozhny, and Georgy F. Zaboronok, pereulok Obukha, 4, kv. 56, Moscow, both of U.S.S.R.**

**Continuation of Ser. No. 491,556, Jul. 24, 1974, Pat. No. 4,095,083. This application Aug. 12, 1977, Ser. No. 825,167**

**Int. Cl.² B23K *9/00***

**U.S. Cl. 219—121 EB** **4 Claims**



1. An electron-beam apparatus for thermal treatment by electron bombardment, comprising:

a vacuum chamber accomdating an object being treated;

an electron gun housed in said vacuum chamber and including a cathode which is the source of an electron flow, and

an accelerating electrode forming, together with said cathode, said electron gun, said cathode and said accelerating electrode forming said electron flow into an electron beam directed to said object being treated, and being electrically insulated from each other and from said object being treated;

a first power source one leadout of which is connected to said cathode and the other leadout is connected to said object being treated; and

a supplementary source of accelerating voltage one leadout of which is connected to said cathode in common with said one leadout of said first power source and the other leadout of which is connected to said accelerating electrode.

---

**4,147,916**

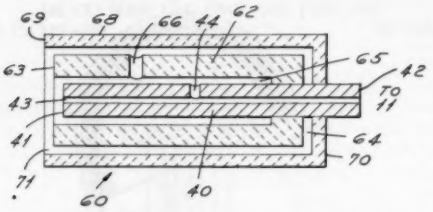
## SPLIT-FLOW NOZZLE FOR ENERGY BEAM SYSTEM

**Thomas E. Fairbairn, Westland, Mich., assignor to Sirius Corporation, Toledo, Ohio**

**Filed Apr. 5, 1976, Ser. No. 673,491**

**Int. Cl.[2] B23K** *9/00*

**U.S. Cl. 219—121 P** **10 Claims**




1. In an apparatus for generating an energy beam, said apparatus including a sine wave generator having a tank coil formed of a hollow electrically conductive tube, and a system for supplying fluid through said tube, the improvement of a nozzle adapted to be attached at one end of said tube comprising:

a first hollow elongated sleeve having first and second ends;

an elongated hollow electrode having first and second ends and a central passage therethrough, said hollow electrode being mounted radially interiorly of said first sleeve and spaced radially interiorly thereof to define an air gap therebetween;

said hollow electrode closing the second end of said first sleeve;

the first end of said hollow electrode being recessed axially inwardly of the first end of said first sleeve; and

an aperture extending radially through said hollow electrode to define a fluid path between said passage of said hollow electrode and said air gap;

whereby upon the application of fluid through said tube and upon activating said sine wave generator, a laminar fluid flow is produced by said nozzle including an inner column of fluid flowing solely through said electrode and emanating outwardly from said nozzle at the electrode first end and conducting said energy beam to a target, and simultaneously a second column of fluid flowing through said aperture and said air gap and emanating between said electrode first end and said first sleeve first end and surrounding and sheathing said energy beam.

**4,147,917**

## METHOD AND DEVICE FOR PLASMA-MIG-WELDING

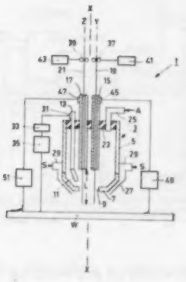
**Gerardus Jelmorini, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Mar. 17, 1977, Ser. No. 778,604**

**Claims priority, application Netherlands, Mar. 31, 1976, 7603319**

**Int. Cl.[2] B23K** *9/00*

**U.S. Cl. 219—121 P** **7 Claims**



1. A method of plasma-MIG welding, which comprises flowing a thermally ionizable inert gas past a non-consumable electrode maintained at a positive polarity and out through a nozzle toward a workpiece; establishing a plasma arc between said non-consumable electrode and said workpiece to initiate and sustain a plasma flow; feeding a first consumable electrode maintained at a positive polarity through said plasma flow and out through said nozzle toward the workpiece; establishing a first MIG-arc between said first consumable electrode and said workpiece; separately feeding a second consumable electrode maintained at a positive polarity through said plasma flow and out through said nozzle toward the workpiece, the directions of feeding said two consumable electrodes being substantially parallel to each other and to the nozzle axis, there being an absence of contact between said two consumable electrodes throughout their entire lengths; and establishing a separate, second MIG-arc between said second consumable electrode and said workpiece.

---

**4,147,918**

## METHOD OF MAKING KNIVES

**Rolf Ritter, Geislingen, and Hermann Riegert, Treffelhausen, both of, Fed. Rep. of Germany, assignors to Wurttembergische Metallwarenfabrik, Geislingen, Steige, Fed. Rep. of Germany**

**Continuation of Ser. No. 724,080, Sep. 17, 1976, abandoned. This application May 4, 1977, Ser. No. 793,547**

**Claims priority, application Fed. Rep. of Germany, Sep. 25, 1975, 2542883**

**Int. Cl.[2] B23K** *15/00*

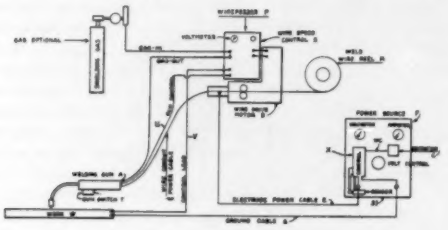
**U.S. Cl. 219—121 EM** **4 Claims**

1. The method of making knives in which an unhardened knife blade and a hollow knife handle are joined together by welding, comprising the steps of joining the unhardened blade with the hollow handle by electron-beam welding while simultaneously creating a vacuum in the handle to remove air therefrom, and hardening the knife blade after welding has taken place.

## 4,147,919
## REMOTE CONTROL PORTABLE WIREFEED ARC WELDING SYSTEM

John L. Matasovic, deceased late of Mokena, Ill., by Stella B. Matasovic, executor, 230 W. Monroe St., Suite 2040, Chicago, Ill. 60606

Filed Jan. 24, 1977, Ser. No. 761,697
Int. Cl.[2] B23K 9/10
U.S. Cl. 219—132 5 Claims



1. In a portable wirefeed arc welding system for depositing metal on a selected piece of work and having a power source including a normally open contactor, a portable wirefeed unit, a welding gun including a normally open gun switch, a ground cable interconnecting said power source and said work, an electrode power cable interconnecting said contactor with said wirefeed unit and said gun, and control leads interconnecting said wirefeed unit with said work and said gun; a remote control unit including a normally inoperative sensing means,

a capacitor connected in series with said gun switch across said power cables and said gun switch and capacitor in series being connected in parallel with said sensing means,

a voltage source,

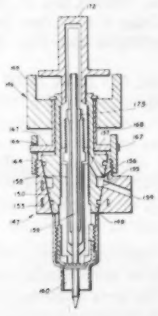
means for charging said capacitor from said voltage source in response to closing of the switch to render said sensing means operative to close said contactor for energizing said cables from said power source,

and means responsive to closure of the contactor to disconnect the capacitor and sense relay from the power cables.

## 4,147,920
## WELDING TORCH AND SUPPORTING APPARATUS

George J. Merrick, Franklin; George E. Cook, Brentwood, and Donald D. Modglin, Nashville, all of Tenn., assignors to Merrick Welding International, Nashville, Tenn.

Division of Ser. No. 654,975, Feb. 3, 1976. This application Dec. 5, 1977, Ser. No. 857,225
Int. Cl.[2] B23K 9/28
U.S. Cl. 219—137.63 2 Claims



1. Apparatus for removably supporting a welding torch, comprising:

base means having a torch receiving opening at least partially defined by a first surface;

said first surface being electrically conductive and being connectable to a source of welding current;

a welding torch including a support portion which fits within said torch receiving opening;

said support portion having an electrically conductive second surface which mates with and contacts said first surface;

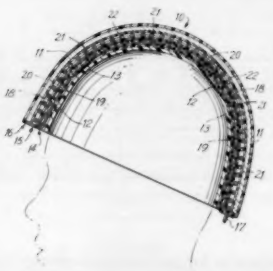
said welding torch including electrode support means in electrically conductive relation with said second surface to receive said welding current; and

cam means operatively engaging said welding torch, when received within said torch receiving opening, and operative in response to rotation of said welding torch relative to said base means to retain said support portion within said torch receiving opening and to firmly seat said second surface against said first surface.

## 4,147,921
## HEAT TREATING ARTICLES

Henry J. Walter, Wilton, and Raymond W. Kunz, Monroe, both of Conn., assignors to Clairol Inc., New York, N.Y.

Filed Sep. 9, 1977, Ser. No. 831,839
Int. Cl.[2] H05B 1/00
U.S. Cl. 219—211 15 Claims



1. A heat treating article comprising a first flexible cover, a layer of wax, a heating element for melting the wax, a layer of insulation which is substantially nonpermeable to the heat generated by the heating element, and a second flexible cover joined with the first flexible cover to enclose the wax layer, heating element, and insulation layer.

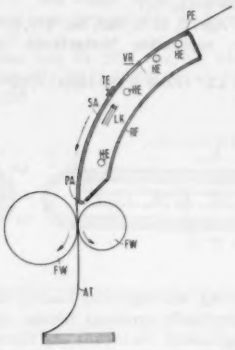
## 4,147,922
## DEVICE FOR FIXING A TONER IMAGE

Helmut Naeser, Munich, and Alban Nusser, Freising, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Nov. 16, 1977, Ser. No. 851,939
Claims priority, application Fed. Rep. of Germany, Feb. 15, 1977, 2706362
Int. Cl.[2] H05B 1/00; G03G 15/20
U.S. Cl. 219—216 17 Claims

1. In a device for fixing a toner images applied to a data carrier by passing the data carrier between two fixing cylinders with at least one of the fixing cylinders being heated, and with a preheating saddle member positioned upstream of the fixing cylinders with the data carrier passing over the saddle and contacting a surface of the saddle on a side of the data carrier opposite a side having the toner image applied thereto with heating elements positioned under the saddle, the improvement: of the heating elements being spaced with respect to the

saddle and to one another such that the sum of the heating powers of all of the heating elements is maximized adjacent a




data carrier entry end of the saddle and thereafter continuously decreases towards a data carrier exit end of the saddle.

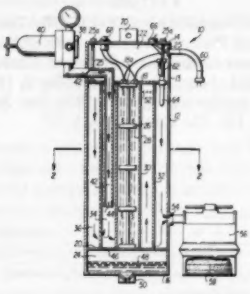
---

**4,147,923**

**ELECTRICAL FILTERED AIR HEATER**

**Oliver T. Davis, Rte. 1, Box 257, and Norman R. Jones, Rte. 2, both of Dunlap, Tenn. 37327**

**Filed Oct. 14, 1977, Ser. No. 842,239**
**Int. Cl.[2] H05B *3/00*; F24H *3/10*; F28F *9/00***
**U.S. Cl. 219—368** **10 Claims**



1. A heater adapted to provide dry, clean and heated air comprising:

(a) a housing having end walls and apertured means forming transverse spaced apart partitions forming first and second compartments,

(b) an electric heating unit located centrally and longitudinally of said housing,

(c) a first tube enclosing said heating element,

(d) a second tube enclosing said first tube, said first and second tubes extending between said spaced apart partitions to form a first chamber between said first and second tubes, said second compartment serving as a storage means for condensation formed in said first chamber and a second chamber between said second tube and said housing, said second tube having a plurality of apertures therethrough connecting said second chamber with said first chamber,

(e) inlet means for admitting compressed air into said first chamber,

(f) outlet means for removing said compressed air from said second chamber, and

(g) electrical control means for controlling the degree of energization of said heating unit in response to the temperature inside said second chamber.

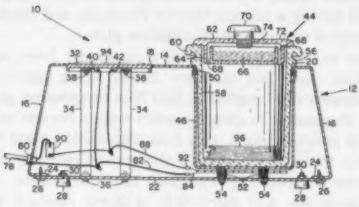
---

**4,147,924**

**TORTILLA WARMER**

**Charles M. DeWitt, Jr., 103 Marchmont, San Antonio, Tex. 78213**

**Filed Aug. 8, 1977, Ser. No. 822,715**
**Int. Cl.[2] F27D *11/02***
**U.S. Cl. 219—417** **5 Claims**



1. An apparatus for providing a continuous supply of hot tortillas at a dining table comprising:

an enclosed housing having an upper surface, a base, and walls, said housing having a pair of openings in said upper surface;

first resistive heating means in a first of said openings and in a plane with said upper surface, said resistive heating means being larger in diameter than a normal tortilla;

power means for connecting said first resistive heating means to a source of electrical power;

ceramic vessel means in a second of said openings, said ceramic vessel means being generally cylindrical in shape with a cross section being larger in diameter than said normal tortilla;

second resistive heating means in close proximity to said ceramic vessel means;

means for connecting said second resistive heating means to said source of electrical power;

cover means for said ceramic vessel means for closing an upper opening of said ceramic vessel means;

mounting means for holding said ceramic vessel means in place;

reservoir means in said cover means adapted for receiving water therein, passages from said reservoir to a bottom side of said cover means allowing steam from said reservoir to pass to an inside of said ceramic vessel means; and

handle means connected to said cover, said handle means being removable for providing a conduit to said reservoir for adding water thereto.

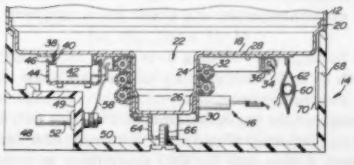
---

**4,147,925**

**PERCOLATOR PARTITION PLATE HEATER ASSEMBLY**

**Irving R. Belinkoff, Queens Village, N.Y., assignor to Kidde Consumer Durables Corp., Bala Cynwyd, Pa.**

**Filed Apr. 26, 1978, Ser. No. 900,361**
**Int. Cl.[2] H05B *3/06*; F27D *11/02***
**U.S. Cl. 219—530** **6 Claims**



1. A percolator partition plate heater assembly comprising:

(a) a one-piece non-corrosive metal partition plate having a centrally located well and an axially extending peripheral flange,

(b) an annular heat distribution plate having its inner periphery closely adjacent to the outer periphery of said well, the outer periphery of said heat distribution plate being spaced radially inwardly from the periphery of said partition plate, said heat distribution plate being fixedly connected to and in direct contact with the bottom surface of said partition plate,

(c) a main heater coil surrounding said well, said main heater coil having a portion thereof thermally and mechanically coupled to said heat distribution plate,

(d) an auxiliary heater radially outwardly from said main heater coil, said auxiliary heater being thermally and mechanically coupled to said heat distribution plate,

(e) a thermostat in direct contact with a bottom surface of said partition plate, said heat distribution plate having a hole through which said thermostat extends, mounting means cooperating with said heat distribution plate for maintaining said thermostat in direct contact with said surface of said partition plate, and

(f) circuitry including said thermostat in parallel with said auxiliary heater, and said thermostat and auxiliary heater being in series with said main heater coil.

---

**4,147,926**

## ELECTRICAL HEATABLE MUFF AND PROCESS FOR ITS MANUFACTURE

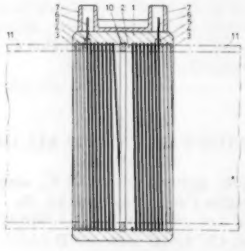
**Paul Stähli, Jona, Switzerland, assignor to Geberit AG, Jona, Switzerland**

**Filed Dec. 15, 1976, Ser. No. 750,764**

**Claims priority, application Switzerland, Dec. 18, 1975, 16416/75**

**Int. Cl.[2] H05B *3/58***

**U.S. Cl. 219—535** **4 Claims**



1. Electrically heatable welding muff of thermoplastic material for exteriorly connecting plastic pipes, said muff comprising

(a) a heating wire winding disposed in its interior wall, the ends of said winding being led outwardly for connection to a current source; and

(b) resilient tabs projecting from said interior wall for spring-like engagement of said pipes to be inserted in said muff, to assure a snug seat for said pipes prior to welding, said resilient projections being formed of material forced out of a groove cut in said interior wall of said muff.

**4,147,927**

## SELF-REGULATING HEATING ELEMENT

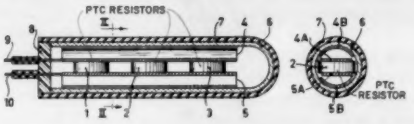
**Franz L. G. Pirotte, Brussels, Belgium, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Apr. 5, 1976, Ser. No. 673,407**

**Claims priority, application Netherlands, Apr. 7, 1975, 7504083**

**Int. Cl.[2] H05B *3/02*; H01C *7/02***

**U.S. Cl. 219—541** **3 Claims**




1. A self-supporting, self-regulating heating element, which comprises a longitudinally arranged tubular body closed at each end, two longitudinal electrically and thermally conductive flat strips positioned in said tubular body parallel to and spaced from each other, each of said flat strips being provided along at least one longitudinal edge thereof with an abutting longitudinal resilient heat-conducting strip formed to conform with the adjacent surface of the inner wall of said tubular body so as to be in resilient heat-exchange contact with said adjacent inner surface for conducting heat from said flat strip to said tubular body, at least one PTC resistor between and in electrical and heat-exchange contact with said parallel flat strips, and electrical terminals extending through said tubular body in contact with said flat strips.

---

**4,147,928**

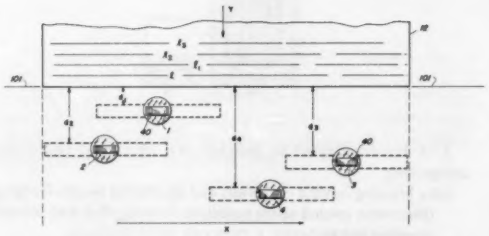
## SCANNING ARRAY CONFIGURATION

**Peter A. Crean, and Pierre A. Lavallee, both of Penfield, N.Y., assignors to Xerox Corporation, Stamford, Conn.**

**Continuation-in-part of Ser. No. 793,009, May 2, 1977, Pat. No. 4,122,352. This application Apr. 17, 1978, Ser. No. 896,855**

**Int. Cl.[2] G06K *7/14, 9/10***

**U.S. Cl. 235—454** **2 Claims**



1. An array for use in apparatus of the type employing plural arrays disposed so that a finite portion of one array overlaps a finite portion of an adjoining array to provide a composite array, comprising

a. an array substrate, said substrate being generally rectangular in shape;

b. a multiplicity of operating elements on said substrate, said operating elements being disposed in succession longitudinally of said substrate;

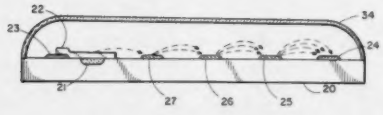
c. the center-to-center distances between said operating elements in said finite portion of said array being different than the center-to-center distances between the remainder of said operating elements of said array whereby to provide a vernier-like spacing between said operating elements in the finite portion of said array facilitating alignment of at least one operating element in said array with an operating element in the adjoining array.

4,147,929

## OPTICAL PHOTOEMISSIVE DETECTOR AND PHOTOMULTIPLIER

Henry F. Taylor, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 31, 1977, Ser. No. 829,542
Int. Cl.[2] H01J *39/06, 39/12, 39/16*
U.S. Cl. 250—207 6 Claims




1. An optical photoemissive detector comprising:
an optical waveguide for transmitting optical energy signals;
a layer of photoemissive material overlying said optical waveguide;
a grounded first electrode position in contact with said layer of photoemissive material;
a second electrode positioned in spaced relationship from said grounded first electrode;
a common substrate which supports said optical waveguide, said layer of photoemissive material, and said electrodes;
a source of dc potential connected across said electrodes; and
a load resistance connected between said second electrode and the high potential of said dc potential source, whereby said optical energy signals transmitted along said optical path produce commensurate electrical signals across said load resistance.

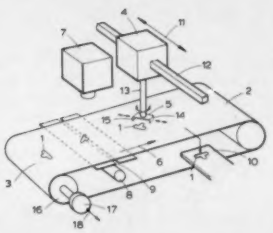
5. An optical photomultiplier comprising:
an optical path for transmitting optical energy signals;
a layer of photoemissive material overlying said optical path;
a grounded first electrode positioned in contact with said layer of photoemissive material;
a source of dc potential;
a second electrode positioned in spaced relationship from said grounded first electrode and connected to the high potential side of said source of dc potential;
a plurality of dynodes comprised of secondary emission material positioned between said first and second electrodes, and spaced at gradually increased distances from said layer of photoemissive material;
a common substrate which supports said optical path, said layer of photoemissive material, said electrodes, and said dynodes;
means for developing graduated potentials from said source of dc potential;
means connecting each of said graduated potentials to one of said dynodes in accordance with its spaced distance from said first grounded electrode; and,
a load resistance connected between said second electrode and said source of dc potential, whereby the electrical signals developed across said load resistance are the instantaneous multiples of the optical energy signals transmitted along said optical path.

4,147,930

## OBJECT LOCATION DETECTOR

Arthur Browne, Horley, and Waheed G. Baig, Ewell, both of England, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 667,580, Mar. 17, 1976, abandoned.
This application Sep. 28, 1977, Ser. No. 837,406
Claims priority, application United Kingdom, Mar. 20, 1975, 11659/75
Int. Cl.[2] G01D *21/04;* H01J *39/12*
U.S. Cl. 250—223 R 5 Claims




1. An apparatus for locating an object having a predetermined projection figure on a projection surface, comprising:
first means for linear scanning in a raster pattern, said first means including means for providing uni-directional non-repetitive longitudinal linear relative motion between the object and a straight line perpendicular to the longitudinal motion, a sequentially scanned linear array of radiation detectors arranged along said straight line, and means for repetitively scanning said linear array, whereby said projection figure has relative motion perpendicular to said array,
second means for determining first tangent points of a first pair of tangents parallel to the line scan of said raster upon an initial detection of a projection figure by a line scan during the frame scanning motion, said initial detection being a detection of a farthest extending point of the projection figure in response to said linear scanning; said first tangent points being applied to opposite sides of said projection figure, and being the interception points of the first and last line scans to intercept said figure,
third means for determining second tangent points of a second pair of tangents to said projection figure, said second pair of tangents being parallel to the frame scanning motion of said raster and being applied to opposite sides of said projection figure, said second tangent points being the interception points of the line scans which intercept said figure earliest and latest from the start of their scans, and
fourth means for determining, on the basis of the relative positions of the four tangent points, first, the orientation of the object with respect to said line and frame scanning motions and, second, the position of a reference point on the object relative to the tangents.

---

4,147,931

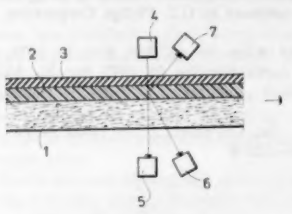
## PROCEDURE FOR MEASURING UNIT AREA WEIGHTS

Pertti Puumalainen, Puistokatu 10 B 43, 70100 Kuopio 10, Finland

Filed Oct. 27, 1977, Ser. No. 845,969
Int. Cl.[2] G01N *23/20*
U.S. Cl. 250—273 2 Claims

1. Improvement in a procedure for measuring unit area weights in material combinations having a base material, thereupon a precoat and upon which latter there is a surfacing coat or coats, wherein the improvement comprises that the materials combination is irradiated with x-rays which excite the characteristic x-ray radiation of a substance in the precoat, the intensity of which is measured above and below the coated

base material, in addition to which the absorption in the materials combination of the primary radiation from the radiation



source is measure whereby from the mutually independent results of measurement obtained the unit area weights of the different courses are calculated.

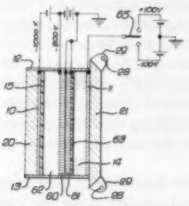
---

**4,147,932**

## LOW LIGHT LEVEL AND INFRARED VIEWING SYSTEM

**John H. Lewis, Los Angeles, Calif., assignor to Xonics, Inc., Van Nuys, Calif.**

**Filed Sep. 6, 1977, Ser. No. 830,787**
**Int. Cl.[2] H01J *31/49*; G03G *13/00*; H01J *31/50***
**U.S. Cl. 250—330** **25 Claims**



1. In a viewing system, the combination of:
first and second electrodes;
means for supporting said electrodes in spaced relation with a gap therebetween;
means for connecting an electric power source across said electrodes for attracting electrons toward one electrode and positive charge toward the other depending upon the polarity of the power source;
a photoresponsive layer on the inner face of said first electrode, with radiation directed onto said layer through said first electrode producing an electrostatic charge image at said gap; and
a plurality of electrophoretic particles dispersed in a dielectric liquid in said gap, with said particles being selectively deposited at said second electrode as a function of said electrostatic charge image.

---

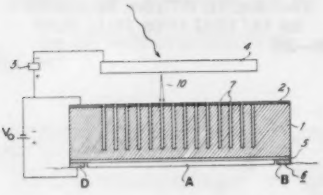
**4,147,933**

## SOLID-STATE DEVICE FOR DETECTING AND LOCATING THE POINTS OF IMPACT OF IONIZING RADIATION

**Henri Rougeot, and Guy Roziere, both of Paris, France, assignors to Thomson-CSF, Paris, France**

**Filed May 10, 1977, Ser. No. 795,425**
**Claims priority, application France, May 14, 1976, 76 14716**
**Int. Cl.[2] G01T *1/22***
**U.S. Cl. 250—370** **7 Claims**

1. A device for detecting and locating ionising radiation, comprising a semiconductor body; means for creating throughout the thickness of said body, between two opposite faces thereof, a space charge zone in which an electric field substantially perpendicular to said faces exits, within which field the displacement of free electrons appearing on one of said two faces in the semiconductor body under the effect of the incident ionising radiation, occurs; means at the other of the two faces for picking up said free electrons, as well as for locating the point of impact of said electrons on said pick-up means; characterised in that said semiconductor body has the property of secondary emission, with an emission coefficient



better than unity; and in that it contains a network of microscopic passages extending perpendicularly to said two faces, said passages opening out at that face of the semiconductor at which said free electrons appear.

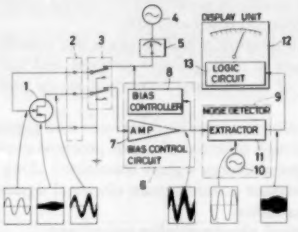
---

**4,147,934**

## DEVICE FOR MEASURING HIGH-LEVEL IONIZING RADIATION DOSE

**Takio Tomimasu, and Mitukuni Chiwaki, both of Tokyo, Japan, assignors to Agency of Industrial Science & Technology, Tokyo, Japan**

**Continuation-in-part of Ser. No. 750,372, Dec. 14, 1976, abandoned. This application Jan. 13, 1978, Ser. No. 869,275**
**Claims priority, application Japan, Dec. 16, 1975, 51-149072**
**Int. Cl.[2] G01T *1/22***
**U.S. Cl. 250—370** **3 Claims**




1. A device for the measurement of ionizing radiation dose, which comprises, in combination, a junction field effect transistor to be irradiated by ionizing radiation under test, means for applying an input signal to said junction field effect transistor, means for detecting the noise voltage generated consequently by said junction field effect transistor, and means for squaring the number of the noise voltage thus detected.

---

**4,147,935**

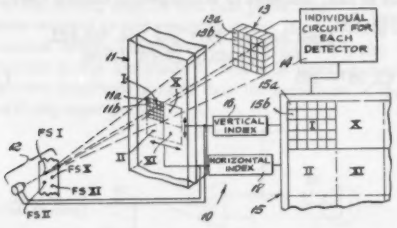
## METHOD AND APPARATUS FOR PRODUCING A RADIOLOGICAL IMAGE OF AN OBJECT

**Harald F. H. Warrikhoff, Keplerstrasse 8-10, Berlin 10, Fed. Rep. of Germany (D1000)**

**Filed Jan. 31, 1975, Ser. No. 546,086**
**Claims priority, application Fed. Rep. of Germany, Mar. 4, 1974, 2410230**
**Int. Cl.[2] G03B *41/16***
**U.S. Cl. 250—416 TV** **14 Claims**

1. The method of producing a radiological image of an object having a plurality of subfield areas comprising the steps of providing an X-ray focal spot and a detector unit with the detector unit comprising an array of a plurality of individual X-ray detectors closely grouped together, placing the object between the focal spot and the detector unit, limiting and

positioning the array to a position with respect to the object to be normally within the low intensity distribution cone pro-




duced by scattered radiation in the object, and forming a subfield image of a subfield area by using the X-rays detected simultaneously by the individual detectors.

---

**4,147,936**

## METHOD OF MAKING TOMOGRAPHIC IMAGES OF X-RAYED OBJECTS

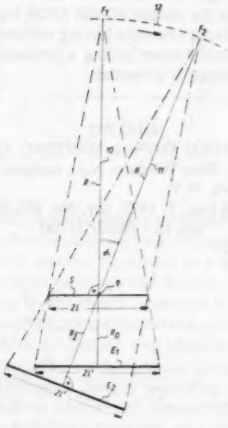
**Rolf Eickel, Münich, Fed. Rep. of Germany, assignor to AGFA-Gevaert AG, Leverkusen, Fed. Rep. of Germany**

**Filed Dec. 30, 1977, Ser. No. 866,035**

**Claims priority, application Fed. Rep. of Germany, Jan. 7, 1977, 2700364**

**Int. Cl.² G01N *21/34, 23/04***

**U.S. Cl. 250—445 T** **10 Claims**



**1.** A method of making a tomographic image of a selected layer of an object which is disposed between a source of a bundle of X-rays, including a central beam, and a dielectric receptor sheet which is confined in the gas-filled interelectrode gap of an ionography imaging chamber, comprising the steps of moving the source of X-rays in a first direction along a first path at one side of said layer; and moving the imaging chamber in synchronism with the source along a second path at the other side of said layer, including imparting to the chamber a translatory movement in a second direction counter to said first direction, pivoting the chamber about an axis which is located in the plane of said layer to thereby maintain the sheet in a plane which is normal to the central beam of said bundle, and varying the distance between the sheet and said layer so that the length of the projection of said layer into the plane of the sheet remains unchanged.

**4,147,937**

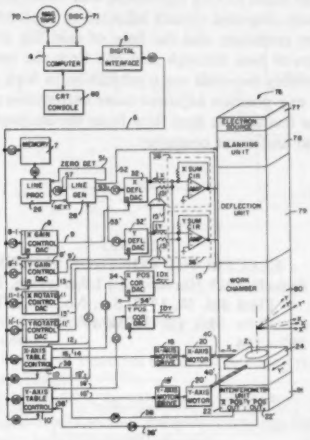
## ELECTRON BEAM EXPOSURE SYSTEM METHOD AND APPARATUS

**Fred K. Buelow, Los Altos Hills; John J. Zasio, Sunnyvale, and Laurence H. Cooke, Cupertino, all of Calif., assignors to Fujitsu Limited, Kawasaki, Japan**

**Filed Nov. 1, 1977, Ser. No. 847,485**

**Int. Cl.² A61K *27/02***

**U.S. Cl. 250—492 A** **24 Claims**




**1.** An apparatus for controlling an exposing beam to selectively scan a pattern on a work piece comprising,

computer apparatus for supplying digital information records specifying the pattern to be scanned,

processor apparatus, connected to receive the information records from said computer apparatus, for converting the information records to line scan information,

line generator apparatus, connected to receive the line scan information from said processor apparatus, for providing beam position signals to scan the exposing beam on the work piece at locations determined by the scan information.

---

**4,147,938**

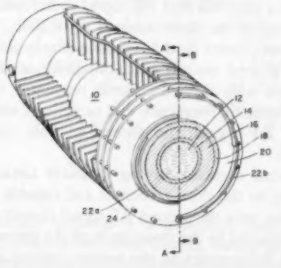
## FIRE RESISTANT NUCLEAR FUEL CASK

**Richard C. Heckman, and Marvin Moss, both of Albuquerque, N. Mex., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed Feb. 7, 1978, Ser. No. 875,821**

**Int. Cl.² G21F *5/00***

**U.S. Cl. 250—506** **9 Claims**



**1.** A fire resistant cask for transportation and storage of

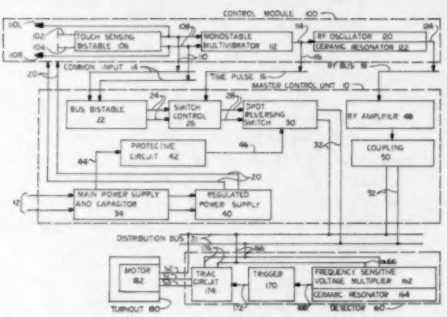
radioactive material comprising: an inner container for containing said radioactive material, a layer of gamma and neutron radiation shielding materials surrounding said inner container, an outer container surrounding said layer and inner container, a plurality of spaced apart heat conducting fins projecting outwardly from said outer container, and heat-expansible movable wall means intermediate said spaced apart fins substantially bridging the space between the fins with intermost surfaces at all times having substantial and direct exposure to the atmosphere, disposed closely adjacent to outermost surface of said outer container and the base of said fins during normal dissipation of heat through said fins from the inner container and reversibly movable upon subjection to high exterior temperature to a position adjacent outer extremities of said fins to house the fins against heat flow from the atmosphere through the fins to said outer container.

---

## 4,147,939
## ELECTRONIC CONTROL SYSTEM

**Jack A. Russell, 1019 Harms Ave., Libertyville, Ill. 60048**

**Filed Jul. 18, 1977, Ser. No. 816,257**
**Int. Cl.[2] H03K** *17/00*
**U.S. Cl. 307—116** **29 Claims**




1. A device for electrically moving a first three-lead motor of a model railroad switch and a second three-lead motor of a model railroad switch so that each will move to back and forth or right and left positions as desired, comprising:

(a) a master control energized by a power source;

(b) a first control module capable of selecting the position of the switch and containing an RF frequency oscillator with a first ceramic resonator operating at a first specific frequency and capable of issuing a precise first RF signal, the module coupled to the control;

(c) a first detector having a second ceramic resonator matched to the first resonator and capable of selectively receiving only the first RF signal therefrom, the detector connected to the three leads of the motor;

(d) a second control module capable of selecting the position of the second switch and containing an RF frequency oscillator with a third ceramic resonator operating at a second specific frequency and capable of issuing a precise second RF signal, the second module coupled to the control;

(e) a second detector having a fourth ceramic resonator matched to the third resonator and capable of selectively receiving only the second RF signal therefrom, the detector connected to the three-leads of the second motor; and,

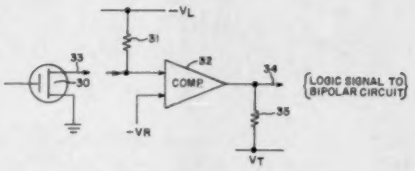
(f) means for connecting the master control and the detectors whereby a position selection by the first module is effectuated by the first motor and a position selection by the second module is effectuated by the second motor.

---

## 4,147,940
## MOS INTERFACE CIRCUIT

**William W. Beydler, Laurel, and Arden R. Helland, Pasadena, both of Md., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Jan. 24, 1977, Ser. No. 761,822**
**Int. Cl.[2] H03K** *19/08, 17/04*
**U.S. Cl. 307—205** **1 Claim**



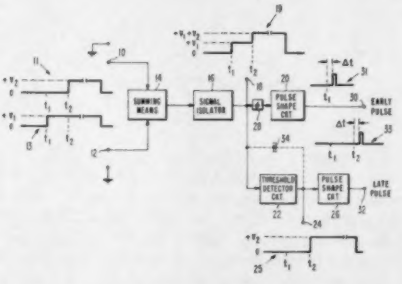

1. An improved method of interfacing an MOS logic circuit utilizing an MOS output stage with a logic circuit having different signal requirements, the improvement comprising; coupling the output terminal of said MOS logic circuit to a first negative potential voltage source through a resistor with the polarity of said voltage source being selected and coupled across the MOS logic circuit such that said output stage operates as a source follower, coupling the output terminal of said MOS logic circuit to a first input terminal of a comparator, and coupling a second input terminal of said comparator to a reference voltage said reference voltage having a second negative potential and being of a magnitude between ground and said first negative potential to generate at an output terminal of said comparator a first signal compatible with the logic circuit with which said MOS logic circuit is to be interfaced, in response to a second signal on the output of said MOS logic circuit, said second signal having a first state having substantially a ground potential and a second state having a potential between said first and second negative potentials.

---

## 4,147,941
## TIME DISPLACED SIGNAL SORTING APPARATUS

**Walter R. Curtice, West Windsor, N.J., assignor to RCA Corporation, New York, N.Y.**

**Filed Dec. 7, 1977, Ser. No. 858,291**
**Int. Cl.[2] H03D** *13/00*
**U.S. Cl. 307—232** **9 Claims**




1. A circuit for providing a relatively early signal pulse and a relatively late signal pulse at first and second output terminals, respectively, corresponding in time to first arriving and second arriving input signal pulses, each signal being applied to a different one of a pair of input terminals of said circuit, the first pulse being present when the second pulse arrives, comprising:

means responsive to said input pulses for producing, as a function of time, a sum signal pulse having an amplitude

directly related to the sum of the respective amplitudes of said output pulses;

means coupled to said summing means for producing at said first output terminal said relatively early pulse in response to the leading edge of said sum pulse; and

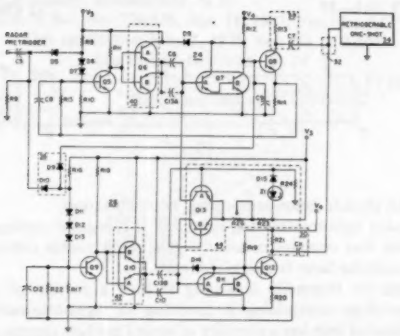
means coupled to said summing means for producing at said second output terminal said relatively late pulse in response to the amplitude of said sum signal exceeding a known amplitude greater than the amplitude of the first arriving input pulse.

---

## 4,147,942
## FAST RECOVERY ONE-SHOT

**Charlie F. Reeves, Del Mar, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Division of Ser. No. 697,514, Jun. 18, 1976, Pat. No. 4,051,390. This application Jul. 1, 1977, Ser. No. 812,299**
**Int. Cl.[2] H03K** *3/10*
**U.S. Cl. 307—273** **11 Claims**



1. In a monostable multivibrator including an input transistor means having a first conducting state during stable operation of said multivibrator and for switching to a quasistable state in response to an input pulse applied thereto, said multivibrator further including timing means connected to said input transistor means for establishing the quasistable period of said quasistable state of said multivibrator, said timing means including an R-C network including a timing capacitor and a timing resistor, said multivibrator further including output transistor means connected to said timing means timing capacitor for switching from a first conductivity state during stable operation of said multivibrator and to a second conductivity state during quasistable operation of said multivibrator, the improvement comprising:

in said timing means, first means connected between said timing capacitor and said timing resistor for reducing the recovery time of said multivibrator without affecting said quasistable period;

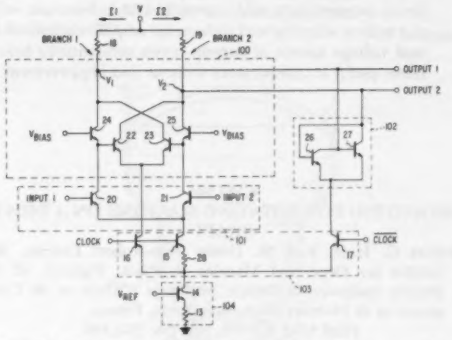
said timing resistor having a first end connected to a source of d.c. potential and a second end connected to said first means; and

said first means comprising first and second transistors, each having a base and an emitter, the bases of said first and second transistors being connected to said timing resistor, the emitters of said first and second transistors being connected to said timing capacitor.

## 4,147,943
## SENSITIVE HIGH SPEED CLOCKED COMPARATOR

**James G. Peterson, Redondo Beach, Calif., assignor to TRW Inc., Los Angeles, Calif.**

**Filed Feb. 14, 1978, Ser. No. 877,698**
**Int. Cl.[2] H03K** *5/20*
**U.S. Cl. 307—355** **23 Claims**



1. A voltage comparator having first and second states which comprises:

means responsive to a control signal for selecting the state of said comparator;

first means, responsive to an input voltage difference, for providing first and second currents when the first of said comparator states has been selected;

a differential current amplifier operable when the first of said comparator states has been selected, for amplifying the difference between said first and second currents;

second means responsive to said differential current amplifier for producing a differential voltage which is a function of the amplified difference between said first and second currents; and

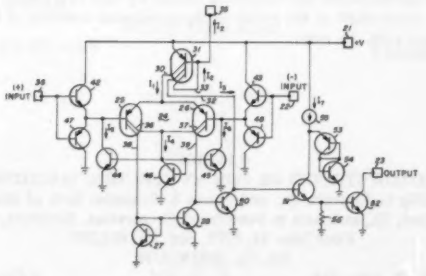
latching means coupled to said second means for increasing and latching said differential voltage when the second of said comparator states has been selected.

---

## 4,147,944
## COMPARATOR WITH SIGNAL RELATED ADAPTIVE BIAS

**Dennis M. Monticelli, Fremont, Calif., assignor to National Semiconductor Corporation, Santa Clara, Calif.**

**Filed Oct. 25, 1977, Ser. No. 844,759**
**Int. Cl.[2] H03K** *1/02, 5/00*
**U.S. Cl. 307—362** **7 Claims**



1. In a voltage responsive comparator, said comparator including a differential amplifier having means for supplying a source of operating current, differential inputs, and an output that constitutes said comparator output, means for coupling a reference voltage to one of said differential inputs, and means

for coupling a voltage source to the other of said differential inputs, said comparator ordinarily producing an error when coupled to voltage sources of limited current capability, the improvement comprising:

means for controlling said operating current in proportion to the current available from said voltage source; and

means for biasing at least one input of said differential amplifier in proportion to said current available from said voltage source whereby said differential amplifier responds to said voltage source at current levels substantially below those useful in comparators without said improvement.

---

**4,147,945**

## MOUNTING FOR ROTATING MACHINE ON A DRIVE SHAFT

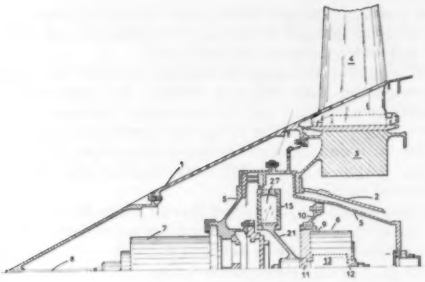
**Robert G. Holz, Vert St. Denis; Jean-Robert Lesieux, St. Michel sur Orge, and Maurice R. Pigot, Vigneux, all of France, assignors to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation, Paris, France**

**Filed May 3, 1978, Ser. No. 902,396**

**Claims priority, application France, May 31, 1977, 77 17172**

**Int. Cl.[2] H02K** *23/60, 7/02*

**U.S. Cl. 310—115** **10 Claims**



1. A rotating machine of the type comprising a rotor fixed to a drive shaft for rotation with respect to a stator, characterized by the fact that the stator is carried on a free end of the drive shaft of the rotor, said stator being mounted for free rotation with respect to said shaft and supporting first means and second means, the first means opposing in normal operation a resistant couple on the rotor, and the second means suppressing automatically perturbations caused by said first means on the drive shaft in the event of the accidental rotation of the stator with the rotor.

---

**4,147,946**

## ROTOR STRUCTURE FOR AN ELECTRIC MACHINE

**Phillip S. Linscott, Jr., and James S. Schmohe, both of Rockford, Ill., assignors to Sundstrand Corporation, Rockford, Ill.**

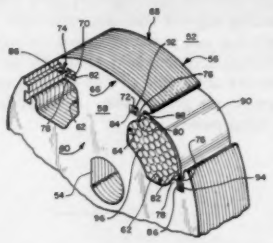
**Filed May 31, 1977, Ser. No. 802,237**

**Int. Cl.[2] H02K** *3/48*

**U.S. Cl. 310—214** **5 Claims**

1. In a rotor for an electrical machine, the rotor adapted to rotate about an axis, said rotor having at least two recesses receiving windings, a thin flexible wedge spanning each recess for retaining the windings therein, the improvement comprising:

means on said rotor engaging the edges of each wedge for minimizing radial deformation of the wedges due to a bending moment developed by centrifugal force during



rotation of the rotor and for preventing separation of the wedges from the rotor.

---

**4,147,947**

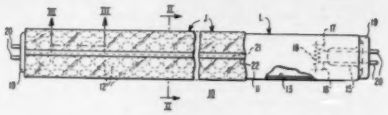
## FLUORESCENT LAMP WITH INTEGRAL THERMAL-INSULATING PLASTIC JACKET

**Frederick W. Hoeh, deceased, late of Livingston, N.J. (by Inga Hoeh, personal representative), assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Jan. 31, 1978, Ser. No. 873,816**

**Int. Cl.[2] H01J** *61/42, 61/52*

**U.S. Cl. 313—27** **12 Claims**



1. An electric lamp comprising, in combination;

a sealed light-transmitting envelope of elongated configuration that contains means for generating visible radiation when the lamp is energized, and

means for thermally insulating at least a portion of said envelope comprising a covering of light-transmitting material that has a plurality of sealed pockets therein and is secured in overlying encircling relationship with the envelope, said pockets being defined by locally distended portions of said covering material and disposed in a predetermined array throughout the material.

---

**4,147,948**

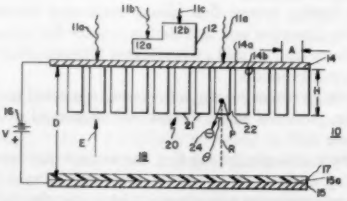
## APPARATUS FOR X-RAY RADIOGRAPHY

**Kei-Hsiung Yang, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.**

**Division of Ser. No. 759,426, Jan. 14, 1977. This application May 8, 1978, Ser. No. 903,603**

**Int. Cl.[2] H01J** *39/06, 31/49*

**U.S. Cl. 313—101** **4 Claims**



1. Apparatus for X-ray radiography, comprising:

a first conductive planar electrode adapted to transmit a pattern of differentially-absorbed X-ray radiation;

a second conductive planar electrode spaced from, and parallel to, said first electrode;

a sheet of insulative material adjacent a surface of said second electrode facing said first electrode;

a structured photocathode fabricated as a block of X-ray photoemissive material directly upon the surface of said first electrode facing said second electrode, said block photoemissive material having a multiplicity of substantially randomly arranged apertures formed completely therethrough;

an avalanche-amplifying gas filling the gap between said insulative sheet and said structured photocathode and filling the volume of the apertures to first electrode surface;

means for forming an electric field between said first and second electrodes;

the photoemissive material of said photocathode emitting, responsive to said X-ray radiation, charged particles from the entire surface area thereof, said charged particles interacting with said gas and said field, respectively, for amplification and subsequent collection at said sheet.

---

**4,147,949**

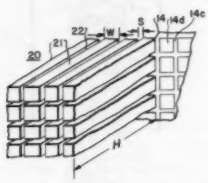
## APPARATUS FOR X-RAY RADIOGRAPHY

**Kei-Hsiung Yang, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.**

**Division of Ser. No. 759,426, Jan. 14, 1977, Pat. No. 4,117,368. This application May 8, 1978, Ser. No. 903,604**

**Int. Cl.[2] H01J** *39/06, 39/24*

**U.S. Cl. 313—101** **7 Claims**




1. Apparatus for X-ray radiography, comprising:

a first conductive planar electrode adapted to transmit a pattern of differentially-absorbed X-ray radiation, said first electrode having a surface with an array of a plurality of raised portions formed thereon;

a second conductive planar electrode spaced from, and parallel to, said first electrode;

a sheet of insulative material adjacent the surface of said electrode facing said first electrode;

a structured photocathode fabricated as a two-dimensional array of spaced substantially rectangular parallelopiped columns of an x-ray photoemissive material, each of said column being fabricated upon one of said raised portions upon said first electrode surface and being substantially perpendicular thereto, each said column having a substantially constant cross-section and extending from said first electrode surface a portion of thc distance to said insulative sheet; said columns defining a grid devoid of said photoemissive material therebetween;

an avalanche-amplifying gas filling the gap between the insulative sheet and said array of columns and filling the volume of the grid between said columns; and

means for forming an electric field between said first and second electrodes;

the photoemissive material of said array of columns emitting, responsive to said X-ray radiation, with charged particles interacting with said gas and said field, respectively, for amplification and subsequent collection at said sheet.

**4,147,950**

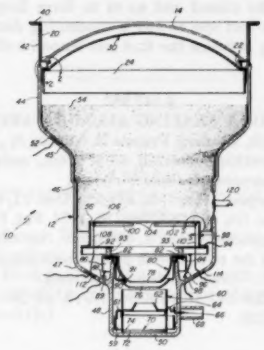
## IMAGE TUBE WITH CONDITIONED INPUT SCREEN

**James R. Caraher, Stamford; William M. Rappoport, Westport; Donald F. DeCou, West Redding, and William C. Deits, Huntington, all of Conn., assignors to The Machlett Laboratories, Inc., Stamford, Conn.**

**Filed Apr. 4, 1977, Ser. No. 784,207**

**Int. Cl.[2] H01J** *61/24, 61/28, 39/02*

**U.S. Cl. 313—181** **7 Claims**



1. An image intensifier tube comprising:

a sealed envelope having an input faceplate and an output faceplate;

an input screen disposed within the envelope in alignment with the input faceplate, said input screen comprising a scintillator layer of fluorescent material capable of oxygenation and an overlying layer of photoemissive material; an output screen disposed within the envelope in spaced opposing relationship with the input screen and adjacent the output faceplate; and

controllable oxygen liberating means including an oxygen source disposed within the sealed envelope between the input screen and the output screen capable of oxygenating the scintillator layer and oxidizing the photoemissive layer as desired.

---

**4,147,951**

## GAS DISCHARGE LAMP HAVING A DOUBLE ELECTRODE ARRANGEMENT

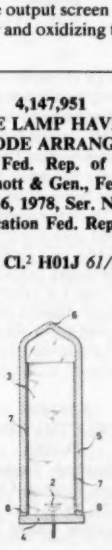
**Gerd Mueller, Mainz, Fed. Rep. of Germany, assignor to JENAer Glaswerk Schott & Gen., Fed. Rep. of Germany**

**Filed Jan. 16, 1978, Ser. No. 869,691**

**Claims priority, application Fed. Rep. of Germany, Jan. 15, 1977, 2701541**

**Int. Cl.[2] H01J** *61/30*

**U.S. Cl. 313—220** **5 Claims**



1. A gas discharge lamp, comprising: first and second electrodes; an elongated glass tube having a closed end and an open end opposite the closed end; a separate electrically insulating substantially planar disc mounted in gas-tight sealed fashion in

the tube open end; electrical lead-in wires positioned through the insulating disc connecting and supporting said electrodes; a separation plate having one end connected in gas-tight fashion to the insulating disc between the electrodes, entire side edges of the separation plate connecting in gas-tight fashion to sides of the glass tube except for a portion of at least one of the side edges adjacent the insulating disc at which is provided a gas-permeable discharge-tight aperture means for cataphoresis suppression, and the separation plate extending from the insulating disc along a length of the tube and terminating at a point spaced from the closed end so as to form first and second discharge tight half spaces and a connecting discharge space communicating between the first and second half spaces.

---

**4,147,952**

## METHOD OF SEALING ALUMINA ARC TUBE

**Edward A. Webb, Reading; Francis B. Makar, Jr., Beverly, and Nikolaos Barakitis, Haverhill, all of Mass., assignors to GTE Sylvania Incorporated, Danvers, Mass.**

**Continuation-in-part of Ser. No. 531,936, Dec. 12, 1974, which is a division of Ser. No. 445,063, Feb. 25, 1974, Pat. No. 3,886,392. This application Sep. 8, 1975, Ser. No. 611,047**

**The portion of the term of this patent subsequent to May 27, 1992, has been disclaimed.**

**Int. Cl.[2] H01J** *6/36, 17/16, 61/30*

**U.S. Cl. 313—220** **1 Claim**

1. An arc tube for a high pressure sodium lamp comprising: an alumina arc tube having a cylindrical alumina plug sealed at each end thereof, each plug having a large and a small diameter section, the small diameter section being inserted into the arc tube and the large diameter section being outside the arc tube, the capillary space between the small diameter section and the inner wall of the arc tube being filled with a sealing glass, the capillary space between the large diameter section and the end of the arc tube being filled with a sealing glass, a niobium tube extending through said plug, said niobium tube being sealed to said plug along the entire length of said plug by a sealing glass, means on said niobium tube for axially aligning said niobium tube within said cylindrical alumina plug, said means comprising wires welded to the niobium tube, and an electrode disposed on the inner end of said niobium tube.

---

**4,147,953**

## CATHODE CONSTRUCTION FOR LINEAR BEAM TUBES

**Maurice Esterson, Chelmsford, England, assignor to English Electric Valve Company Limited, Chelmsford, England**

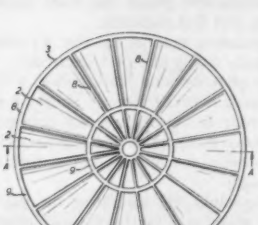
**Filed Dec. 27, 1976, Ser. No. 754,001**

**Claims priority, application United Kingdom, Dec. 29, 1975, 52944/75**

**Int. Cl.[2] H01J** *1/46, 1/52, 19/38*

**U.S. Cl. 313—299** **9 Claims**

3. A linear beam tube including a gridded electron gun with a concave cathode surface in which a plurality of individual cathode emitting regions formed by channels are provided, each channel being of semi-circular concave cross section whereby the electron beam from the gun is formed of a plural-



ity of convergent subsidiary beams, said channels extending radially outwards from the center of said cathode.

---

**4,147,954**

## THERMIONIC ELECTRON EMITTER

**Richard A. Tuck, Slough, England, assignor to E M I-Varian Limited, Hayes, England**

**Filed Jul. 7, 1977, Ser. No. 813,529**

**Claims priority, application United Kingdom, Jul. 10, 1976, 28799/76**

**Int. Cl.[2] H01J** *1/14, 1/28*

**U.S. Cl. 313—337** **11 Claims**

1. A thermionic electron emitter to emit electrons when heated, including

a tubular support having at least a thin wall portion of thickness less than 0.1mm,

a body of thermionic electron emissive material compressed in the tubular support within the said thin wall portion, and

a reinforcing ring, coaxial with the tube, within the body providing constraint against cracking of the body.

---

**4,147,955**

## TRAVELLING WAVE TUBES

**Robin C. M. King, Chelmsford, England, assignor to English Electric Valve Company Limited, Chelmsford, England**

**Filed Jan. 18, 1977, Ser. No. 760,398**

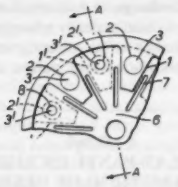
**Claims priority, application United Kingdom, Apr. 13, 1976, 4645/76**

**Int. Cl.[2] H01J** *25/34*

**U.S. Cl. 315—3.5** **15 Claims**

1. A travelling wave tube of the cloverleaf slow wave circuit type having a plurality of inwardly directed noses defining a cloverleaf main cavity and including frequency selective attenuation means in the form of a subsidiary cavity confined substantially wholly within at least one of said inwardly directed noses defining said cloverleaf cavity so as to be external to such cloverleaf cavity and which subsidiary cavity contains a sufficient quantity of dielectric material loaded with attenuation material as to provide frequency selective attenuation while reducing the physical size of the subsidiary cavity, for the frequency range at which attenuation occurs, sufficiently to

allow said subsidiary cavity to be substantially wholly confined within said one inwardly directed nose as aforesaid, and means



for coupling said subsidiary cavity with the cloverleaf cavity associated with said one nose or with an adjacent cloverleaf cavity of the tube.

---

**4,147,956**

## WIDE-BAND COUPLED-CAVITY TYPE TRAVELING-WAVE TUBE

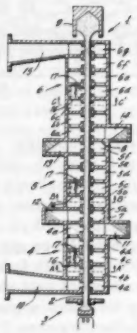
**Toshinori Horigome, and Takao Kageyama, both of Tokyo, Japan, assignors to Nippon Electric Co., Ltd., Tokyo, Japan**

**Filed Mar. 4, 1977, Ser. No. 774,403**

**Claims priority, application Japan, Mar. 16, 1976, 51-28343; Mar. 16, 1976, 51-28344; Dec. 23, 1976, 51-155734**

**Int. Cl.[2] H01J *25/34***

**U.S. Cl. 315—3.6** **9 Claims**



1. A wide-band coupled-cavity type traveling-wave tube adapted to amplify a high frequency signal, said traveling wave tube comprising:

(A) means defining a long beam path;

(B) electron gun means for generating an electron beam and for directing said beam along said beam path;

(C) a collector electrode located at a terminal end of said long beam path;

(D) a plurality of preliminary slow-wave circuits and an output slow-wave circuit disposed along said beam path, each of said slow-wave circuits including:

(1) first and second coupler cavities located at opposite ends of said slow-wave circuit;

(2) at least two main cavities located between said coupler cavities;

(3) coupling irises located in partition walls between adjacent said main cavities; and

(4) interaction gaps permitting said electron beam to interact with traveling waves in said slow-wave circuit;

(E) circuit sever sections having non-reflective terminals and disposed between adjacent ones of said slow-wave circuits;

(F) each of said main cavities having the same height and inner diameters;

(G) each of said interaction gaps having the same dimensions;

(H) each of said irises in all but one of said preliminary slow-wave circuits and each of said irises in said output slow-wave circuit having the same first predetermined size and shape; and

(I) each of said irises in said one of said preliminary slow-wave circuits having the same second predetermined size and shape which is smaller than said first predetermined size and shape whereby said one of said preliminary slow-wave circuits exhibits a lower band pass than the remaining of said slow-wave circuits.

---

**4,147,957**

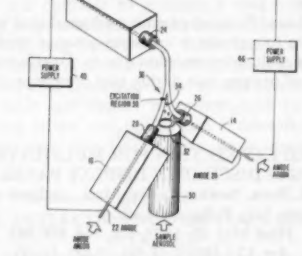
## PLASMA JET DEVICE AND METHOD OF OPERATING SAME

**Karl J. Hildebrand, Tyngsboro, Mass., assignor to SpectraMetrics, Incorporated, Andover, Mass.**

**Filed Jan. 13, 1978, Ser. No. 869,164**

**Int. Cl.[2] G01J *3/30*; H01H *1/00*; H05B *41/16***

**U.S. Cl. 315—111.2** **18 Claims**



1. A plasma jet device adapted for use in a spectrometer system, which plasma jet device comprises in combination:

(a) a first and second electrode of one polarity;

(b) an electrode of a different and opposite polarity than the first and second electrodes;

(c) the first and second electrodes spaced apart and nonsymmetrically positioned such that their axes, if extended, would intersect at an acute angle;

(d) the electrode of different polarity spaced apart from the angle of intersection of the first and second electrodes and offset from the plane formed by the intersecting axes;

(e) means surrounding the electrodes to flow an ionizable gas about the said electrodes and to form in operation a plasma jet of a column of ionized gas between the said electrodes

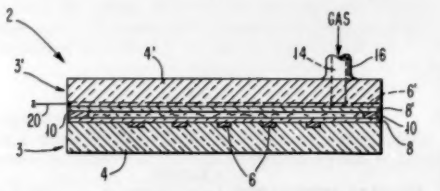
(f) an excitation zone formed by the ionized gas of the plasma jet between the acute angle of the first and second electrodes and at the lower region of the intersection of the extended axes of the first and second electrodes, the plasma jet containing the excitation zone characterized by an inverted Y-shape of the ionized gas; and

(g) means to introduce a sample material to be analyzed spectrometrically directly into the lower region of the excitation zone and between the acute angle of the electrodes of the plasma jet, whereby a plasma jet, having an excitation zone of stabilized position, is maintained during operation of the device to provide for a constancy in intensity of the spectrum of the sample material.

## 4,147,958
## MULTICOLOR GAS DISCHARGE DISPLAY MEMORY PANEL

William E. Ahearn, Purdys, and Kyu C. Park, Yorktown Heights, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 30, 1977, Ser. No. 811,749
Int. Cl.[2] H05B 37/00, 39/00, 41/00
U.S. Cl. 315—169.4 26 Claims



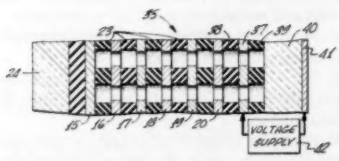

1. In an AC gas discharge display panel having
an open panel structure with at least two substrates and respective dielectric layers thereon,
a luminous ionizable gaseous medium with a pronounced visible discharge emission between said dielectric layers and
exhibiting characteristics such that said gaseous medium may periodically be driven by the drive voltage therefor to discharge condition thereacross, the improvement comprising:
a helium based Penning gaseous medium doped with oxygen operable to provide a luminous gaseous medium which exhibits multicolor emission due to the efficient recombination of oxygen ions during said discharge condition.

---

## 4,147,959
## DISPLAY SECTION FOR MULTILAYER GAS-DISCHARGE DISPLAY PANEL

Theodore H. Bonn, Newton Centre, Mass., assignor to Beckman Instruments, Inc., Fullerton, Calif.

Filed May 25, 1977, Ser. No. 800,383
Int. Cl.[2] H05B 37/00, 39/00, 41/00
U.S. Cl. 340—779 10 Claims



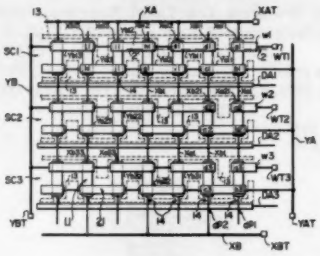

1. A gas discharge display comprising:
a reservoir means for containing an ionizable gas;
a plurality of addressing electrode means being located adjacent said reservoir means, each of said addressing electrode means having a plurality of apertures;
an apertured display electrode mounted over said plurality of addressing electrode means, said apertured display electrode forming a plurality of display cells, said addressing electrode means apertures being aligned with said apertured display electrode to form a plurality of gas filled columns defining a display matrix;
a transparent, insulating plate extending across the front of said apertured display electrode;
a transparent electrode covering the front surface of said plate, on the opposite side of said plate from said reservoir means; and
means connected between said apertured display electrode and said transparent electrode for applying voltage pulses of alternating polarity to said apertured display electrode and said transparent electrode, said voltage applying means acting in conjunction with said addressing electrode means to alternately create a visible discharge and extinguish said discharge in a selected one of said display cells in response to said polarity changes, the intensity of said visible discharge being directly related to the frequency and amplitude of said pulses of said alternating polarity.

---

## 4,147,960
## PLASMA DISPLAY PANEL INCLUDING SHIFT CHANNELS AND METHOD OF OPERATING SAME

Shizuo Andoh, and Kazuo Yoshikawa, both of Kobe, Japan, assignors to Fujitsu Limited, Japan

Filed Nov. 28, 1977, Ser. No. 855,439
Claims priority, application Japan, Dec. 6, 1976, 51-146983; May 31, 1977, 52-63649; May 31, 1977, 52-63650; May 31, 1977, 52-63651
Int. Cl.[2] H01J 61/067, 61/10; H05B 37/00, 41/14
U.S. Cl. 340—769 31 Claims




1. A plasma display panel comprising:
a plurality of parallel shift channels, each said shift channel comprising a series of shift discharge cells, each said shift cell being defined between opposing portions of a pair of electrodes respectively disposed on a pair of substrates and separated by a gas discharge space,
a plurality of display discharge cells located in close association with respective ones of said shift cells, said close association allowing for the fire priming effect of said display cells from discharging ones of said respective shift cells to decrease the firing voltage in said associated display cells, said display cells being similarly defined between opposing portions of display electrodes on said substrates,
means for electrically connecting said electrodes of said shift and display cells to respective buses without cross-over for supplying panel operating voltage pulses to shift information in the form of discharge spots selectively along said shift channels and to selectively discharge said display cells by means of said fire priming effect to display said information being shifted.

---

## 4,147,961
## ENERGY-CONSERVING SOLID-STATE-CONTROLLED ILLUMINATION SYSTEM

Robert T. Elms, Monroeville, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Dec. 19, 1977, Ser. No. 861,587
Int. Cl.[2] G05F 1/00; H05B 37/02, 39/04, 41/36
U.S. Cl. 315—291 8 Claims

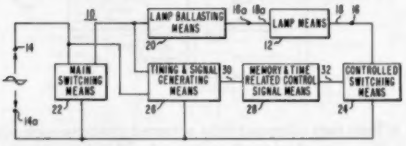
1. An energy-conserving solid-state-controlled illumination system which normally operates high-intensity discharge lamp means at about rated power consumption with a relatively high light output for a predetermined proportion of the first period of the night when a high degree of illumination is desirable and thereafter operates said lamp means at about a predetermined

power less than rated power consumption when a lower degree of illumination can be tolerated, said system comprising:

(a) input terminal means adapted to be connected to a source of electrical energy, and output terminal means adapted to be connected to the input of said lamp means;

(b) lamp ballasting means in circuit with said lamp means between said input terminal means and said output terminal means, said lamp ballasting means having a first operating mode in which about average rated power is delivered to the input of said lamp means to cause same to operate at about rated power consumption, and said lamp ballasting means having a second operating mode in which the average power delivered to the input of said lamp means is a predetermined amount less than the power consumption at which said lamp means is rated;

(c) main switching means having an open nonconductive state and a closed conductive state, said switching means connected in circuit with said input terminal means and said lamp ballasting means to close during the night and energize said lamp means and to open and de-energize said lamp means during the day when there is sufficient light;




(d) controlled switching means, the controlled opening and closing of which places said ballasting means in said first mode or said second mode;

(e) timing and signal generating means responsive to the closing of said main switching means and to the opening of said main switching means to measure the actual time said main switching means is in said closed state during the night and to generate an output signal representative of the actual period of time said main switching means is in said closed state, memory and time-related control signal means connected to the output of said timing means for recording said generated output signal, and said memory and time-related signal means responsive to the next closing of said main switching means to generate a time-related control signal after a time period which represents a predetermined proportion of the actual length of time represented by said recorded timing means signal, and the output of said time-related control signal means connected to said controlled switching means to place said ballasting means in said second mode for the remainder of the nighttime period said lamp means is energized.

---

**4,147,962**

## ENERGY-CONSERVING ILLUMINATION SYSTEM

**Joseph C. Engel, Monroeville, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Dec. 19, 1977, Ser. No. 861,591**

**Int. Cl.[2] G05F *1/00*; H05B *37/02, 39/04, 41/36***

**U.S. Cl. 315—291** **6 Claims**

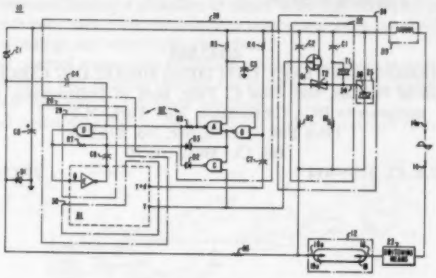
1. An energy-conserving solid-state-controlled illumination system which operates lamp means at about a predetermined rated power consumption with a relatively high light output for a predetermined time when a high degree of illumination is desirable and operates said lamp means at about a predetermined power less than rated power consumption when a lower degree of illumination can be tolerated, said sysem comprising:

a. input terminal means adpated to be connected to a source of electrical energy, and output terminal means adapted to be connected to the input terminals of said lamp means;

b. lamp ballasting means in circuit with said lamp means, said lamp ballasting means having a first operating mode in which the average power passed to said lamp means causes same to operate at about rated power consumption, and said lamp ballasting means having a second operating mode in which the average power passed to said lamp means is a predetermined amount less than the rated power consumption for said lamp means;

c. main switching means having an open state and a closed state, said switching means connected in circuit with said input terminal means and said lamp ballasting means to energize said lamp means when said switching means is in said closed state and to de-energize said lamp means when in said open state;

d. controlled switching means, the controlled closing and



opening of which determines whether said ballasting means is in said first operating mode or said second operating mode;

e. timing means responsive to closing of said main switching means and operable to generate a time-related control signal a predetermined period of time after closing of said main switching means, said time-related control signal applied to said controlled switching means to switch same from said first operating mode to said second operating mode until said system is de-energized by said main switching means, and said system is thereafter quiescent until said main switching means is again closed.

---

**4,147,963**

## VERTICAL DEFLECTION SYSTEM FOR A TELEVISION RECEIVER

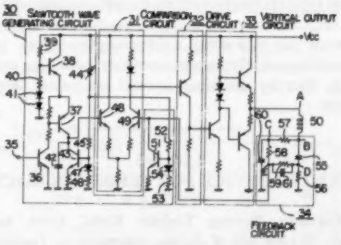
**Tomokazu Shiotani, Ibaraki, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Aug. 8, 1977, Ser. No. 822,643**

**Claims priority, application Japan, Aug. 20, 1976, 51-99921; Aug. 20, 1976, 51-99922; Aug. 23, 1976, 51-100870; Sep. 2, 1976, 51-118572[U]; Dec. 20, 1976, 51-171630[U]**

**Int. Cl.[2] H01J *29/70***

**U.S. Cl. 315—387** **10 Claims**




1. A vertical deflection system for a television receiver comprising;

a sawtooth wave generating circuit for generating a highly linear sawtooth wave signal having a vertical deflection period;

a comparison circuit including a differential amplifier connected to an output of said sawtooth wave generating

circuit, said sawtooth wave signal being applied to one input of said comparison circuit;

an amplifier circuit connected to an output of said comparison circuit for amplifying an output signal of said comparison circuit for application to a vertical deflection coil to cause a vertical deflection current to flow therethrough; and

a feedback circuit connected in series with said vertical deflection coil for applying both a D.C. component and an A.C. component of said vertical deflection current to the other input terminal of said differential amplifier of said comparison circuit.

---

**4,147,964**

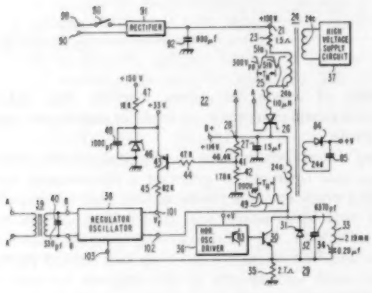
## COMPLEMENTARY LATCHING DISABLING CIRCUIT

**David W. Luz, and John C. Peer, both of Indianapolis, Ind., assignors to RCA Corporation, New York, N.Y.**

**Filed Feb. 9, 1978, Ser. No. 876,228**

**Int. Cl.[2] H01J *29/70***

**U.S. Cl. 315—411** **27 Claims**




1. A disabling circuit comprising: an oscillator circuit with an input terminal responsive to control signals for generating at an output terminal of said oscillator circuit a first signal at a first rate determined by said control signal;

a first transistor coupled to said output terminal for switching conductive states at said first rate;

a load circuit coupled to said first transistor, normal operation of said load circuit dependent upon said first transistor switching conductive states at said first rate;

a second transistor of a conductivity type complementary to said first transistor, the appropriate output and input terminals of each of said first and second transistors coupled to one another in a manner forming a complementary latch; and

an input fault terminal coupled to said complementary latch and responsive to a fault signal coupled to said input fault terminal for activating said complementary latch and preventing said first transistor from switching conductive states, thereby disabling normal operation of said load circuit.

---

**4,147,965**

## SWITCHING DEVICE FOR FEEDER IN MACHINE TOOLS

**Nobuo Fukuma, Toyota; Yoshito Kato, Aichi, and Kouji Nogami, Toyota, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Aichi, Japan**

**Filed Sep. 22, 1977, Ser. No. 835,648**

**Claims priority, application Japan, Sep. 22, 1976, 51-127720[U]**

**Int. Cl.[2] H02M *1/02***

**U.S. Cl. 318—256** **6 Claims**

1. A directional switching device for a feeder in a machine tool comprising:

a direct current motor for driving a feeder at prescribed speed and with prescribed force;

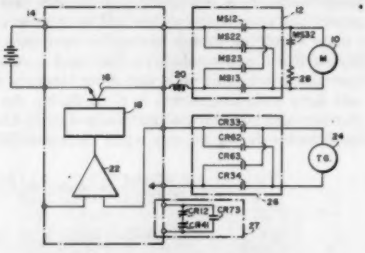
a relay contact circuit provided in an armature circuit of said motor, said relay contact circuit having forward relay contacts and reverse relay contacts each comprising two interlocking contacts; and

a sequence circuit for switch-controlling said relay contact circuits according to forward and reverse commands, said sequence circuit comprising:

a plurality of current relays;

a plurality of main relays;

at least one timing relay;




at least two independently actuated contacts each controlling one of said relays, one of said independently actuated contacts for forward commands and the other for reverse commands, and

a plurality of relay contacts controlled by said current, main and timing relays, said plurality of relay contacts, current relays, main relays, timing relays and independently actuated contacts being arranged and configured to control said relay contact circuit in a predetermined sequence of operation when said forward and reverse commands are given and said main relays are activated when said main relays are supplied no current.

---

**4,147,966**

## MEANS FOR DIGITAL CONTROL

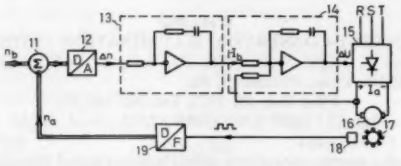
**Per Kain; Robert Lockley, both of Västerås, and Jaroslav Valis, Eskilstuna, all of Sweden, assignors to ASEA AB, Västerås, Sweden**

**Filed Nov. 5, 1976, Ser. No. 739,151**

**Claims priority, application Sweden, Nov. 6, 1975, 75124271**

**Int. Cl.[2] H02P *5/00***

**U.S. Cl. 318—327** **4 Claims**




1. A digital control system for controlling a parameter of a control object in accordance with a digital reference value comprising:

digital differencing means,

feedback transducer means providing a digital output value in accordance with said parameter,

said digital differencing means providing a digital error signal comprising the difference between said digital reference value and said digital output value, integrating means to integrate said error signal and emit an output value to control said parameter of said control object,

the improvement comprising:

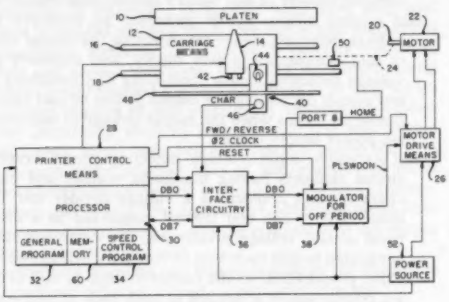
said digital differencing means having a digital reference value input of greater resolution than said digital output value input and providing a digital error signal of resolution at least equal to said digital reference value.

---

## 4,147,967
## APPARATUS AND METHOD FOR CONTROLLING THE VELOCITY OF A MOVEABLE MEMBER

**Peter P. Aiena, Kettering, Ohio, assignor to NCR Corporation, Dayton, Ohio**

**Filed Nov. 10, 1977, Ser. No. 850,169**
**Int. Cl.[2] G05B *11/28***
**U.S. Cl. 318—341** **24 Claims**




1. A system for controlling the velocity of a moveable member relative to a desired nominal velocity, comprising:

means for producing successive signals for incremental distances over which said moveable member is moved;

means for providing groups of operational steps for performing operations in addition to controlling the velocity of said moveable member, whereby each said group of operational steps has a time period associated therewith during which the associated group of operational steps is performed;

means for counting said time periods as the associated groups of operational steps are completed in an interval between said successive signals to provide a first count which corresponds to the actual velocity of said moveable member;

means for comparing said first count with a second count which represents said desired nominal velocity and including means for producing a third count which represents a desired velocity correction resulting from comparing said first and second counts;

a drive means alternately controlled by an energizing on period and a de-energizing off period for moving said moveable member; and

means for receiving said third count and modulating one of said energizing on and de-energizing off periods to said drive means in accordance with said third count so as to modify the velocity of said moveable member, if necessary, to maintain said moveable member at said desired nominal velocity.

---

## 4,147,968
## STEPPER MOTOR CONTROL

**William M. Goble, Perkasie, Pa., assignor to Moore Products Co., Spring House, Pa.**

**Filed Sep. 26, 1977, Ser. No. 836,662**
**Int. Cl.[2] G05B *11/26***
**U.S. Cl. 318—685** **1 Claim**

1. In a stepper motor control system for moving an output member to a position proportional to an electric analog input signal

an analog voltage generating member responsive to said position for generating an electric analog feedback signal proportional to said position,

motor means,

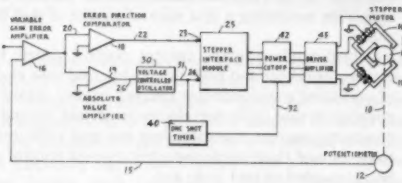
control means for supplying a control voltage for actuation of said motor means,

said control means including members responsive to the difference between said input and feedback signals for delivering a control voltage proportional to the magnitude and direction of said difference,

said motor means comprising a rotor element having permanently magnetized poles around its periphery and a stator element having a plurality of phase windings arranged to advance said rotor element one pole space each time said windings are selectively energized.

said control means also including converting means responsive to said control voltage for generating electric pulses for energizing said stator windings,

said converting means comprising an error direction com-




parator for delivering a logic signal for one polarity of said voltage and a different logic signal for the opposite polarity of said voltage,

an absolute value amplifier for delivering a regulating voltage proportional to the absolute value of said control voltage,

a voltage controlled oscillator responsive to said regulating voltage for generating pulses at a frequency directly related to said regulating voltage,

interface means responsive to said logic signals and to said pulses for establishing a sequence of pulses for controlling the operation of said motor,

amplifying means for said sequential pulses for energizing said windings,

power cut-off means interposed between said interface means and said amplifier means, and

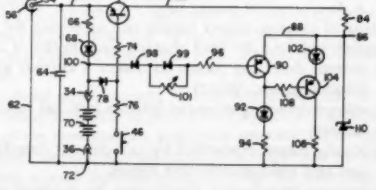
a one shot timer module receiving pulses from said voltage controlled oscillator and providing output pulses of limited duration for controlling said power cut-off means.

---

## 4,147,969
## BATTERY PACK CHARGER AND TESTER

**Curtis H. Miller, Burnsville; Mark R. Kaldun, St. Paul, and Robert A. Arp, Eden Prairie, all of Minn., assignors to Med General, Inc., Minneapolis, Minn.**

**Filed Oct. 3, 1977, Ser. No. 838,491**
**Int. Cl.[2] H02J *7/00*; G01N *27/42***
**U.S. Cl. 320—2** **5 Claims**



1. A charging test stand for use in recharging and testing rechargeable battery packs comprising:

(a) a receptacle having a pair of contacts therein adapted to mate with a battery pack to be charged or tested;

(b) a jack adapted to be connected to a source of direct current potential;

(c) first indicator means coupled in a series path between said jack and said pair of contacts, for providing a visual indication that charging current is flowing through said series path;

(d) a first semiconductor current control means having emitter, collector, and base electrodes, said base electrode being coupled to a first of said pair of contacts and said emitter electrode being coupled to said jack;

(e) a second semiconductor current control means having emitter, collector and base electrodes, said base electrode of said second semiconductor current control means also being coupled to said first of said pair of contacts, the emitter electrode of said second semiconductor current control means being coupled to said collector electrode of said first semiconductor current control means;

(f) second indicator means coupled between said collector electrode of said second semiconductor current control means for indicating a first state of charge of said battery packs;

(g) a third semiconductor current control means having emitter, collector and base electrodes, said base electrode of said third semiconductor current control means being coupled to said collector electrode of said second semiconductor current control means and said collector electrode of said third semiconductor current control means being coupled to said jack; and

(h) a third indicator means connected between the emitter electrodes of said second and third semiconductor current control means for indicating a second state of charge of said battery pack.

---

**4,147,970**

## DIRECT CURRENT POWER SUPPLY DEVICE FOR BATTERY CHARGING

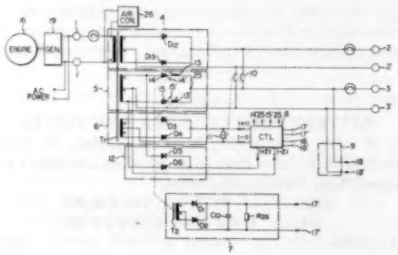
**Yukio Okuda, and Naohiro Katayama, both of Tokyo, Japan, assignors to Sawafuji Electric Co. Ltd., Tokyo, Japan**

**Filed Dec. 20, 1976, Ser. No. 752,287**

**Claims priority, application Japan, Dec. 25, 1975, 50-155536; May 21, 1976, 51-57921; May 21, 1976, 51-57922**

**Int. Cl.[2] H02J 7/04**

**U.S. Cl. 320—21** **14 Claims**



1. A direct current power supply device for rectifying an a-c voltage of external power supply and supplying d-c power to a battery and/or a d-c load characterized in that it comprises:

a current detecting means to detect a current component flowing to said battery,

a voltage detecting means to detect a terminal voltage of said battery,

a control means controlled by said current detecting means and said voltage detecting means,

a leakage transformer functioning by external a-c power supply, and

a charging converter means for supplying d-c power to said battery,

said charging converter means being controlled by said control means and supplied power from the output of said leakage transformer,

said control means comprising a maximum value detecting circuit to combine the output voltage of said current detecting means and said voltage detecting means, a switching circuit controlled by said maximum value detecting circuit, a pulse generating circuit in which pulse rise time is controlled by said switching circuit, and a switching control circuit controlled by said pulse generating circuit,

whereby said direct current power supply device is provided a determined current-voltage characteristic, said characteristic being such that a constant current state is kept until a terminal voltage of said battery reaches a desired level and a constant voltage state is kept when the terminal voltage of said battery reaches said desired level,

said control means further including an excessive input voltage detecting means for detecting the output voltage of said external a-c power supply, said excessive input voltage detecting means controlling said switching control circuit decreasing the output power of said charging converter means when the output voltage of said external a-c power supply is high,

said excessive input voltage detecting means comprises circuit elements having non-linear voltage and current characteristics comprising a voltage divider and Zener diode having one end thereof connected to a division point of said voltage divider and the other end thereof connected to said switching circuit, a d-c voltage having a value proportional to the output voltage of said external a-c power supply is applied to both ends of said voltage divider.

---

**4,147,971**

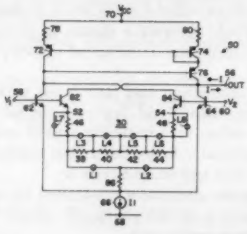
## IMPEDANCE TRIM NETWORK FOR USE IN INTEGRATED CIRCUIT APPLICATIONS

**John J. Price, Mesa, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.**

**Filed Aug. 22, 1977, Ser. No. 826,577**

**Int. Cl.[2] G05F 3/08**

**U.S. Cl. 323—4** **9 Claims**



9. An integrated current reciprocator circuit for providing an output current at an output thereof the polarity of which being dependent upon the polarity of an input signal applied to input terminals of the current reciprocator circuit, comprising:

current source means;

current mirror circuit means for providing first and second output currents at first and second output terminals respectively, said second output terminal being the output terminal of the current reciprocator circuit;

a first differential transistor stage including first and second transistor means each having first, second and control electrodes, said control electrodes being input terminals of the current reciprocator circuit, said first electrodes of said first and second transistor means being coupled to said current source means, said second electrodes of said first and second transistor means being coupled respectively to said first and second output terminals of said current mirror circuit means;

a second differential transistor stage including third and fourth transistor means each having first, second and control electrodes, said control electrodes of said third and fourth transistor means being coupled respectively to said control electrodes of said first and second transistor means, said second electrodes of said third and fourth transistor means being cross coupled respectively to said second electrodes of said second and first transistor means;

an adjustable impedance network for causing the magnitude of the output current of the reciprocator current to be maintained substantially constant but opposite in polarity depending upon the polarity of the input signal, said adjustable impedance network including a plurality of impedance elements serially coupled together between said first electrodes of said third and fourth transistor means, a plurality of thermally machinable metal links each coupled in parallel across a respective one of said plurality of impedance elements for electrically shorting the same, first and second additional thermally machinable metal links serially coupled together and being in parallel with a selected number of said plurality of impedance elements for electrically shorting thereof, said first and second additional metal links being commonly connected to a common node, selected ones of said plurality of metal links being open circuited in conjunction with a predetermined one of said first and second additional metal links being open circuited to vary the magnitude of the output current accordingly; and

circuit means coupling said common node of the adjustable impedance network to said current source means.

---

**4,147,972**

## CONTROL CIRCUIT FOR AN A-C CONTROL ELEMENT

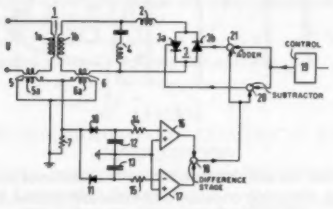
**Werner Hochstetter, Erlangen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany**

**Filed Jul. 6, 1977, Ser. No. 813,287**

**Claims priority, application Fed. Rep. of Germany, Jul. 22, 1976, 2633071**

**Int. Cl.**[2] **G05F** *1/20*

**U.S. Cl. 323—24** **3 Claims**




1. A control circuit for an a-c control element supplied by at least one phase which includes controlled rectifier elements in a two arm arrangement connected to a first transformer having at least a primary and a secondary winding comprising:

(a) a plurality of current transformers, equal in number to the total number of windings in said first transformer, said plurality of current transformers each having its primary winding in series with one of said windings of said first transformer, and the secondary windings of all of said plurality of current transformers which are connected to the same phase tied together in a bucking connection to provide a difference signal output;

(b) a measuring arrangement for measuring the peak value of said difference signal during each positive and negative half-wave having its input coupled thereto, and providing an output signal which is the difference between the positive and negative peaks; and

(c) means for coupling said output signal to the control circuit of the one or the other arm of the a-c control element, depending on the polarity of said output signal.

**4,147,973**

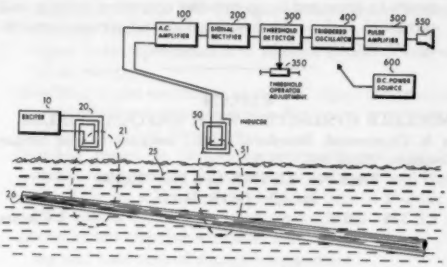
## FREQUENCY DEPENDENT AMPLITUDE MODULATED TRANSLATOR APPARATUS

**Harold J. Weber, 20 Whitney Dr., Sherborn, Mass. 01770**

**Filed Dec. 20, 1976, Ser. No. 752,667**

**Int. Cl.**[2] **G01V** *3/12;* **H04B** *5/02, 13/02*

**U.S. Cl. 324—3** **14 Claims**




1. A translator means operative as a receptor for an ordered first frequency electromagnetic signal pattern, produced by a separate efficacious exciter means, wherein said first frequency signal is modulated so as to produce a series of different amplitude steps, sequentially controlled by a combined plurality of second frequency signal rates which form a harmonic series, wherein further each component second frequency signal forming the combined signal produces a first frequency signal burst, consisting of at least several cycles of first frequency signal, the time duration of which is somewhat less than the full cycle time period of the highest second frequency signal component and further where the second frequency signal controlled serial plurality of first frequency signal bursts are caused to be combined in a manner such that the least frequent, say lowest periodicity, said second frequency component signal provides a said first frequency signal burst of greatest magnitude, whereas the more frequent, say higher periodicity, said second frequency component signal provides said first frequency signal bursts of proportionately less magnitude, wherein said translator includes faculty for subsequent demodulation of the said ordered first frequency signal into individual component second frequency signal repetition rates proportional to the relative mean power of the said ordered first frequency signal arriving at the said receptor means, said translator including in combination:

a. Coupling means for the interception of a first frequency electromagnetic signal comprising a pattern of various magnitudes produced by a separate said exciter means, said coupling means being operative to provide a series of minute alternating current levels proportional to the relative instantaneous power of the first frequency signal energy contained within the said electromagnetic signal;

b. A.C. amplifier means, including input thereto connected to said coupling means, said A.C. amplifier being in a form operative to increase the magnitude of the said minute alternating current levels inputed from the said coupling means and reproducing a greater amplitude level at the output of the said A.C. amplifier means;

c. Demodulator means, connected to said A.C. amplifier means output, operative to recover the said component second frequency signal rates from the said first frequency signal;

d. Threshold adjust means, operatively connected to said demodulator means, to provide for dynamic redetermination of the demodulator amplitude response threshold for selective amplitude separation of the sequential said component second frequency signal from the said first frequency signal bursts;

e. Triggered oscillator means, connected to said demodulator means, operative so as to condition and standardize the said recovered said component second frequency signals

into constituent second frequency signal periods of uniform measure;

f. e. Pulse amplifier means, connected to said triggered oscillator means, operative to effect the said recovered said component plurality of second frequencies lower frequency to be of a form suitable for actuating a subsequent sensory transducer means; and,

g. A source of direct current power including a disconnect means so arranged as to provide operating voltage and current to each of the functional circuit groups comprising the said translator.

---

**4,147,974**

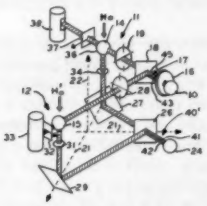
## NUCLEAR GYROSCOPE WITH UNEQUAL FIELDS

**Ivan A. Greenwood, Stamford, Conn., assignor to The Singer Company, Little Falls, N.J.**

**Filed Feb. 22, 1977, Ser. No. 770,884**

**Int. Cl.[2] G01R** *33/08*

**U.S. Cl. 324—0.5 F** **2 Claims**



1. A nuclear magnetic resonance gyroscope which derives rotational information from the phases of precessing nuclear magnetic moments of mercury absorption cells for determining the angle of rotation of the gyroscope about a predetermined axis comprising:

means for producing at least two unidirectional magnetic fields of differeing magnitudes said fields being oriented in the same direction,

first and second absorption cells containing material for producing nuclear magnetic resonance signal in each cell said first and second cells being intersected by said unidirectioal magnetic fields,

optical means for increasing the magnitude of the net magnetic moment of said first and second absorption cells,

means for detecting the phase of output signals from said first and second absorption cells, and

means for combining said detected phases to produce an output from said gyroscope indicative of the rotation of said gyroscope about said predetermined axis.

---

**4,147,975**

## SYNTHETIC TEST CIRCUIT FOR A METAL ENCAPSULATED HIGH VOLTAGE CIRCUIT BREAKER

**Rudolf Pratsch, and Ernst Slamecka, both of Berlin, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany**

**Filed Aug. 3, 1977, Ser. No. 821,341**

**Claims priority, application Fed. Rep. of Germany, Aug. 25, 1976, 2638678**

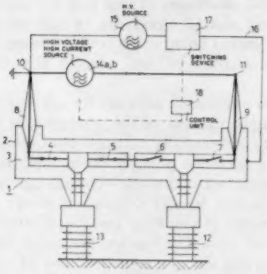
**Int. Cl.[2] G01R** *31/02, 31/14*

**U.S. Cl. 324—28 CB** **4 Claims**

1. In a synthetic test circuit for use in testing a metal encapsulated high-voltage circuit breaker which is grounded on one side and which includes several switching gaps arranged in series within said encapsulation, the test circuit including a high-voltage source and a high current source for stressing the switching gaps being operated during testing, the improvement comprising:

high-voltage means for stressing the insulation within the interior of said encapsulation;

control means coupled to said high-voltage means and to said high-voltage source for causing application of high-voltage from said high-voltage means between ground and said encapsulation simutaneously with the application of a further voltage generated by said high-voltage source



and applied between a contact of an open one of said gaps and ground, said high-voltage being of opposite polarity to said further voltage and said encapsulation being insulated from ground potential during application thereof.

---

**4,147,976**

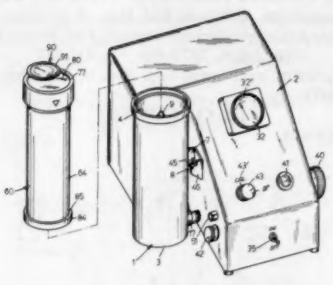
## DEVICE FOR TESTING AND CALIBRATING MOISTURE MEASURING INSTRUMENT

**Robert O. Wang, 2744 S. 61st St., Milwaukee, Wis. 53219**

**Filed Oct. 13, 1977, Ser. No. 841,760**

**Int. Cl.[2] G01R** *27/26*

**U.S. Cl. 324—61 R** **9 Claims**



1. A device for simulating a controlled sample of material of known size, dielectric constant and moisture control, and to be placed in a test cell of an electrical instrument which is used to measure the moisture content of a sample of material, said test cell comprising a hollow cylindrical container having an electrode concentrically arranged therewithin, said device comprising:

a cylindrical body for placement in said container, said body having an axially extending cylindrical opening therein for receiving said electrode and comprising:

concentrically arranged inner and outer hollow cylindrical members of dielectric material defining a cylindrical chamber therebetween;

dielectric means for sealing said chamber at both ends and supporting said members relative to each other;

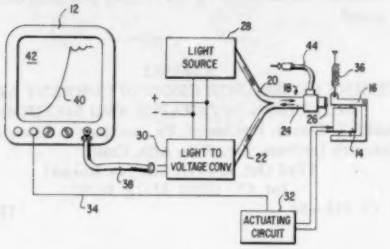
an electrically conductive component sealed within said chamber, said electrically conductive component being in the form of a cylindrical sheet and surrounding said inner dielectric member;

and a quantity of liquid within said chamber, said quantity being sufficient to cause the device to exhibit the same electrical characteristics as said controlled sample.

## 4,147,977
## MOTION ANALYZING SYSTEM

**Paul R. Dimmick, Los Angeles, Calif., assignor to Polaris N.V., Inc., Newport Beach, Calif.**

**Filed Aug. 15, 1977, Ser. No. 824,262**
**Int. Cl.[2] G01R *13/20, 31/02;* G02B *5/14***
**U.S. Cl. 324—121 R** **6 Claims**




**3**. A system for analyzing the motion of an electromechanical device comprising:

means for plotting a trace of an electric signal versus time;

actuating circuit means for energizing the electromechanical device and for initiating the operation of said trace plotting means;

optical means for transmitting light to an aperture and for receiving light from an aperture;

light source means for applying light to said optical means to direct light from said aperture toward the path of movement of said electromechanical device for selective reflection back toward said aperture when said electromechanical device moves into the path of the light;

substantially linear light sensing means for receiving light reflected back to said aperture and for providing an output voltage indicating the position of the electromechanical device in terms of the light reflected back to said aperture;

means for applying said output voltage to said trace plotting means to display the position of said electromechanical device as a function of time after energization of the electromechanical device; and

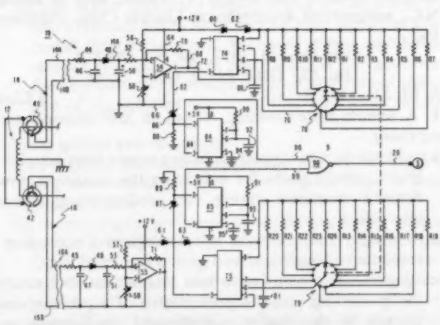
said optical means including a fiber optic array having an elongated generally rectangular aperture.

---

## 4,147,978
## SYSTEM FOR MONITORING ELECTRICAL ENERGY CONSUMPTION

**John R. Hicks, Irving, Tex., assignor to Dupont Energy Management Corporation, Irving, Tex.**

**Filed Dec. 19, 1977, Ser. No. 861,899**
**Int. Cl.[2] G01R *21/06***
**U.S. Cl. 324—142** **17 Claims**



**16**. Electrical circuitry for monitoring the cost of electrical energy consumed by a system over an extended period of time, comprising:

means for sensing the current flowing along an input but into the system and generating a DC signal having an amplitude representative of the magnitude of the input current;

oscillator means responsive to said DC signal for generating an AC signal having a frequency representative of the amplitude of the DC voltage, said oscillator having a variable resistor for adjusting the frequency of the AC signal to be representative of the rate of cost of said electrical energy;

switching means responsive to said AC signal for generating a pulsed digital signal having a frequency representative of the AC signal frequency;

counting means in communication with said switching means for counting the number of pulses of said digital signal during said extended period of time to provide the total cost of said energy consumption; and

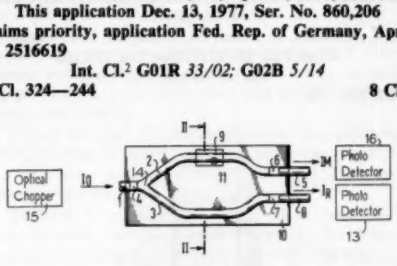
display means responsive to said counting means for displaying said total cost of energy consumption.

---

## 4,147,979
## MOVABLE PROBE CARRYING OPTICAL WAVEGUIDES WITH ELECTRO-OPTIC OR MAGNETO-OPTIC MATERIAL FOR MEASURING ELECTRIC OR MAGNETIC FIELDS

**Peter Baues, Krailling; Hans Mahlein, Munich; Peter Moeckel, Munich; Achim Reichelt, Munich, and Gerhard Winzer, Munich, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany**

**Continuation of Ser. No. 676,679, Apr. 14, 1976, abandoned.**
**This application Dec. 13, 1977, Ser. No. 860,206**
**Claims priority, application Fed. Rep. of Germany, Apr. 16, 1975, 2516619**
**Int. Cl.[2] G01R *33/02;* G02B *5/14***
**U.S. Cl. 324—244** **8 Claims**

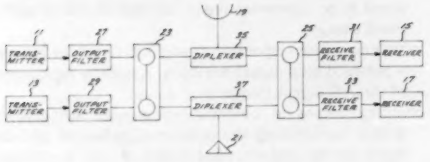



**1**. A movable probe for a point-by-point scanning-like noncontact measurement of electric field strengths in a region of a measurement zone, comprising a first optical wave-guide member having a first index of refraction arranged on a movable substrate means of second index of refraction for movement into the electric field, said first index being greater than said second index, one of said first wave-guide member and substrate means being comprised of an electro-optical material means only in the region of the measurement zone, said electro-optical material means having an index of refraction which changes in the presence of the electric field for coupling light from the first wave guide into the substrate means, a second optical wave guide member of said first index of refraction arranged on said substrate means outside of said measurement zone, a common light input for each of said first and second wave guide members, and the first and second wave guide members and substrate means outside of the region of the measurement zone not having electro-optical material.

## 4,147,980
## REDUNDANT RF SYSTEM FOR SPACE APPLICATION

Robert A. Frosch, Administrator of the National Aeronautics and Space Administration, with respect to an invention of Charles W. Rook, Scottsdale, Ariz.

Filed Jul. 11, 1977, Ser. No. 814,813
Int. Cl.[2] H04B 1/50
U.S. Cl. 325—24 8 Claims

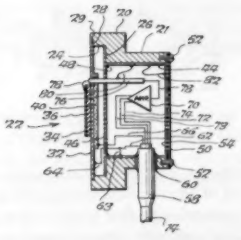



1. A radio frequency transmitter-receiver system comprising:
- a high gain antenna;
- a low gain antenna;
- first and second transmitters for providing first and second outputs respectively;
- first and second receivers for receiving first and second inputs respectively; and
- means for selectably switching one of said first and second outputs to said high gain antenna and selectably switching one of said first and second inputs from said high gain antenna, said means being further selectable for alternatively selectably switching one of said first and second outputs to said low gain antenna and selectably switching one of said first and second inputs from said low gain antenna.

## 4,147,981
## ELECTROSTATIC VOLTMETER PROBE POSITIONED ON THE OUTSIDE OF A HOUSING AND VIBRATED BY A PIEZOELECTRIC TRANSDUCER WITHIN THE HOUSING

Bruce T. Williams, 15 Pound St., Lockport, N.Y. 14094

Filed Feb. 18, 1977, Ser. No. 770,263
Int. Cl.[2] G01R 5/28
U.S. Cl. 324—32 9 Claims

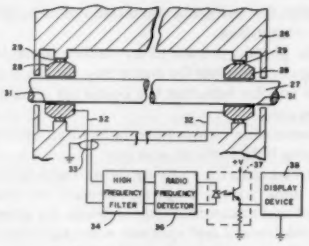


1. A sensor for an electrostatic voltmeter comprising:
(a) a housing including a continuous solid wall portion having substantially parallel inner and outer surfaces, said wall portion being relatively stiff and capable of transmitting vibratory motion;
(b) a voltage sensitive electrode fixed to the outer surface of said housing wall portion and having an exposed operative surface for capacitive coupling to an external field or potential to be measured; and
(c) vibrator means in said housing and mechanically coupled to the inner surface of said housing wall portion for vibrating said electrode in a direction generally perpendicular to said exposed operative surface to vary the capacitive coupling between said electrode operative surface and the external field or potential being measured as a function of the rate of vibration of said electrode to induce an alternating voltage on said electrode having an amplitude proportional to the amplitude of the external field or potential being measured;
(d) whereby the location of said voltage sensitive electrode avoids extraneous dynamic coupling to surfaces other than the surface bearing the field or potential being measured.

## 4,147,982
## TURBINE GENERATOR GROUND CURRENT ARCING DETECTION APPARATUS AND METHOD

Franklin T. Emery, Pittsburgh, Pa., assignor to Electric Power Research Institute, Inc., Palo Alto, Calif.

Filed Oct. 6, 1977, Ser. No. 840,057
Int. Cl.[2] G01R 31/12, 31/02
U.S. Cl. 324—54 11 Claims




1. In a generator having a frame in which a rotor shaft is supported for rotation in a pair of shaft bearings, wherein the shaft bearings are insulated from the frame and a film of lubricant is disposed between the shaft and the bearings, an arc current detector comprising
- a high pass filter having an input and an output and being electrically isolated from the frame, a shielded electrical connection between each of the shaft bearings and the input of said high pass filter,
- a radio frequency detector coupled to receive the output of said high pass filter providing an output indicative thereof and being electrically isolated from the frame,
- and means for receiving said detector output and providing a display thereof, said last named means being isolated electrically from said detector.

## 4,147,983
## REMOTE METER READING MAXIMUM KW DEMAND METER

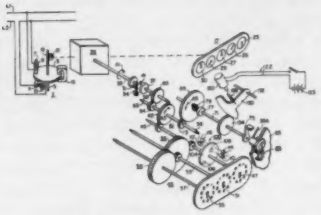
Eugene C. Benbow, and Rodney V. Adams, both of Raleigh, N.C., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Nov. 21, 1977, Ser. No. 853,372
Int. Cl.[2] G01R 11/64; G06C 15/42
U.S. Cl. 324—103 R 5 Claims

1. A remote meter reading maximum KW demand meter comprising:
- a multidial decade register including a gear train coupled to plural pointer shafts for indicating the maximum power demand measured during the predetermined demand interval;
- a rotating member carried in said register for rotation in response to rotation of said gear train;
- sensing means responsive to said rotating member rotation for generating pulses representative of a predetermined amount of electrical power demand concurrently indicated by said register wherein said pulses are generated

incrementally with increase of measured power demand; and

reset means for returning said pointer shafts to an initial state



so that the sensing means generates the power demand representing pulses in a continuous series of pulses representative of the total maximum demand measured by the meter upon activation of said reset means.

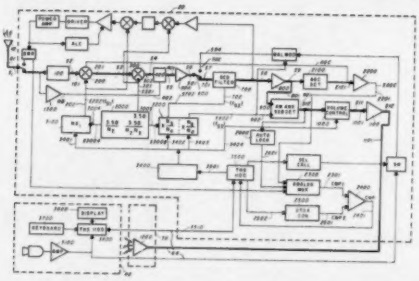
---

**4,147,984**

## DUAL DIGITAL PROCESSOR TRANSCEIVER

**Edward R. Caudel, Dallas; William R. Wilson, Garland, and Thomas E. Merrow, Dallas, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Apr. 27, 1977, Ser. No. 791,616**
**Int. Cl.[2] H04B *1/40***
**U.S. Cl. 325—25** **12 Claims**



1. A dual digital processor radio signal transmitter comprised of first and second units coupled together by a pair of wires,

(a) said first unit being a hand-held control unit including:

(i) keyboard means having a plurality of manually actuatable keys for selecting operating functions of said transmitter and for selecting channels, and

(ii) first digital processor means having inputs coupled to said keyboard means for receiving logic signals of a first coded format from said keyboard means and having outputs coupled to said pair of wires for generating thereon bit-serial messages of a second format indicative of the selected operating functions and channels; and

(b) said second unit including:

(i) a digitally controlled transmitter circuit for transmitting selected modulated radio signals over selected channels, and

(ii) second digital processor means having inputs coupled to said pair of wires for receiving said bit-serial messages from the outputs of said first digital processor means, said second digital processor means being coupled to said digitally controlled transmitter circuit for controlling the operation of said transmitter circuit according to the operating function selected by actuation of said keys and for controlling the channel over which said selected modulated ratio signals are transmitted in accordance with the channel selected by actuation of said keys.

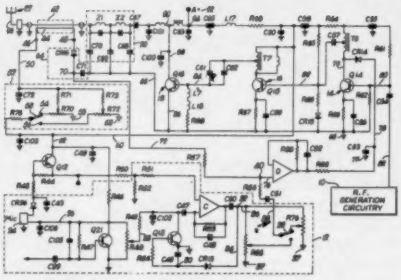
---

**4,147,985**

## LOW LEVEL MODULATION SYSTEM FOR A RADIO TRANSMITTER

**Noel A. Rogers, 9121 W. 70th St., Shawnee Mission, Kans. 66204**

**Filed Jul. 29, 1977, Ser. No. 820,209**
**Int. Cl.[2] H04B *1/04***
**U.S. Cl. 325—144** **2 Claims**




1. In a radio transmitter:

means for producing a radio frequency carrier wave;

means for producing a modulation signal to modulate said carrier wave, and having an output terminal;

amplification means for amplifying the power of said modulated carrier wave,

said amplification means having an input section operably coupled with said carrier wave producing means and said modulation producing means, and having an output section;

means adapted to be operably coupled between an antenna associated with said transmitter and said output section, for receiving an amplified, modulated carrier wave prior to transmission of the latter; and

feedback circuit means coupled between said receving means and said input section for operating on said received wave and for controlling said amplification means responsive thereto,

said output terminal of said modulation producing means being operably coupled with said feedback circuit means for delivering said modulation signal to said input section through said feedback circuit means,

said feedback circuit means including detection means operably coupled with said receiving means for extracting signal information from said wave received by said receiving means, amplifier means having an input terminal thereof operably coupled with said detection means for conditioning said signal information received from said detection means, said amplifier means having an output terminal for delivering a conditioned signal, and regulating circuit means operably coupled between said input section and said output terminal of said amplifying means and responsive to said conditioned signal for controlling said amplification means,

said receiving means including a pair of output terminals,

one of said output terminals of said receiving means being operably coupled with said detection device,

there being further means provided for selectively adjusting the quiescent operating point of said amplifier means, including first and second resistive elements each having an output terminal and an input terminal thereof operably connected with the other output terminal of said receiving, means and manually operable switch means for selectively coupling the output terminal of one of said elements with an electrical voltage source.

## 4,147,986
## AM-FM RECEIVER

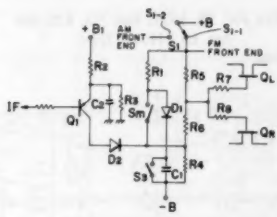
Kaku Sakaida, Tokyo, Japan, assignor to Trio Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 17, 1976, Ser. No. 751,702

Claims priority, application Japan, Dec. 19, 1975, 50-172070[U]

Int. Cl.[2] H04B 1/16

U.S. Cl. 325—316 2 Claims




1. In an AM-FM receiver having AM and FM receiving circuits, said AM receiving circuits including an AM front end circuit, an intermediate frequency stage, and a detector; said FM receiving circuits including an FM front end circuit, intermediate frequency stages and a discriminator; said AM and FM receiving circuits further including an audio amplifier, a first switch for applying operating power selectively to one of said AM and FM front end circuits, and a second switch for selectively connecting the outputs of either said detector or said discriminator to said audio amplifier, the improvement comprising:

at least one switching element inserted in a signal path of the FM receiving circuits after said discriminator;

means for applying a bias voltage to said at least one switching element when said first switch is switched to apply said bias voltage to said FM front end circuit; and

a time constant circuit comprising a series connected resistor, capacitor and diode inserted between said first switch and said at least one switching element in order to delay the application of the bias voltage to said at least one switching element.

---

## 4,147,987
## SUPERHETERODYNE RECEIVER OF SCANNING TYPE

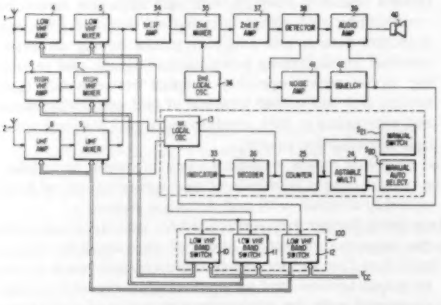
Eigo Imamura, Kusatsu, Japan, assignor to Sanyo Electric Co., Ltd., Moriguchi, Japan

Filed Jan. 5, 1977, Ser. No. 756,831

Claims priority, application Japan, Jan. 19, 1976, 51-6271; May 31, 1976, 51-64798; Jul. 27, 1976, 51-90595; Sep. 14, 1976, 51-111078

Int. Cl.[2] H04B 1/32

U.S. Cl. 325—455 18 Claims




10. A multi-band superheterodyne receiver, comprising means for receiving a high frequency signal including one of a plurality of channels of different frequencies in a selected one of a plurality of frequency bands, local oscillator means for providing an oscillation frequency signal the frequency of which is different by a given frequency difference from said received high frequency signal, a respective mixing means for each of said frequency bands responsive to said received high frequency signal and said local oscillation frequency signal for providing an intermediate frequency signal, said receiver further comprising

means for selecting a respective one of said plurality of frequency bands, said band selecting means comprising a plurality of selection control inputs, an energization line, and a plurality of switching means of a number corresponding to said plurality of bands for selectively connecting said energization line to at least said mixing means of the band to be selected, said plurality of selection control inputs being of a number less than said plurality of switching means and less than the number of bands, a number of said switching means less than said plurality of switching means each being individually coupled to a respective control input, whereby selected ones of said plurality of frequency bands are selected.

---

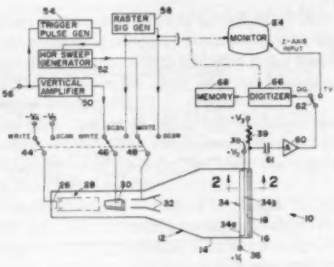
## 4,147,988
## CHANNEL MULTIPLIER PLATE CRT SCAN CONVERTER AND SCAN CONVERSION METHOD

Dennis R. Hall, Beaverton, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Jun. 2, 1977, Ser. No. 802,616

Int. Cl.[2] G11C 11/42, 11/26

U.S. Cl. 328—124 17 Claims




1. Scan conversion apparatus that includes

a plurality of channel electron multipliers disposed in an array having an input face and an output face containing the input and output ends, respectively, of said multipliers, each multiplier in response to electron beam irradiation of its input end generating and emitting electrons at its output end with a gain that after a period of time following the start of such emission decreases substantially for a further time period,

writing means for at first times directing an electron beam onto said input face in accordance with an input signal thereby to irradiate the input ends of certain channel multipliers in said array,

scanning means for at second times during said further time period scanning an electron beam over said input face in a predetermined pattern,

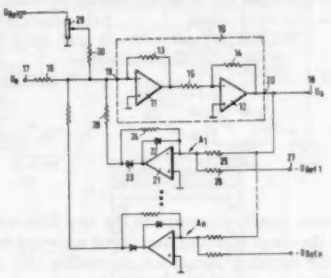
collector means disposed adjacent said output face for collecting electrons emitted by said channel multipliers, and

output circuit means coupled to said collector means for deriving an output signal corresponding to the gain of the channel multipliers as the input face of the array is scanned.

## 4,147,989
## NON-LINEAR DIRECT-CURRENT AMPLIFIER FOR MEASURING PURPOSES

**Kurt Brolde, Lörrach, Fed. Rep. of Germany, assignor to Endress & Hauser GmbH & Co., Maulburg, Fed. Rep. of Germany**

**Filed May 6, 1977, Ser. No. 794,500**
**Claims priority, application Fed. Rep. of Germany, May 7, 1976, 2620282**
**Int. Cl.[2] G06G 7/12**
**U.S. Cl. 328—142** **13 Claims**



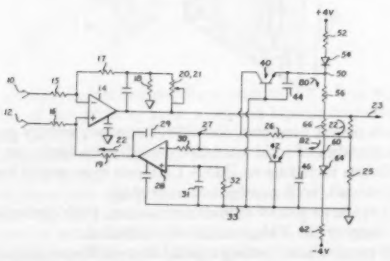
1. A non-linear direct current amplifier comprising:
a main amplifier for receiving an input signal at an input port and generating a corresponding output signal at an output port;
a voltage divider connected between the output port of said main amplifier and a reference potential and having a plurality of voltage tap-off points; and
a plurality of non-linear feedback operational amplifiers connected between said voltage divider and the input port of said main amplifier, each non-linear feedback operational amplifier having a first input connected to at least one of said voltage tap-off points, an output connected to the input port of said main amplifier through a feedback diode and a particular summing resistor, and a second input connected to said output through a feedback resistor and said feedback diode to define a feedback loop for said feedback amplifier.

---

## 4,147,990
## FAST-RECOVERY CIRCUIT

**Edwin A. Dokus, Winchester, and Thomas K. Naylor, Belmont, both of Mass., assignors to American Optical Corporation, Southbridge, Mass.**

**Filed Mar. 7, 1978, Ser. No. 884,322**
**Int. Cl.[2] H03F 21/00**
**U.S. Cl. 330—11** **8 Claims**



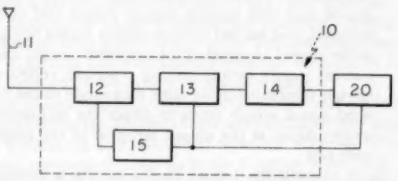
1. An improved fast-recovery circuit connected in the output of a physiological waveform amplifier to a feedback circuit connected to the amplifier input, the feedback circuit including an integrator having resistance and capacitance means for normally supplying low frequency feedback to the amplifier input to cancel low frequency offset appearing thereat, and the fast-recovery circuit including threshold means connected in parallel with at least a substantial portion of said integrator resistance means and normally having a relatively high impedance, the impedance of said threshold means being substantially lowered at least for amplifier output signals in a very low frequency range of concern and greater than a characteristic amplitude threshold level to thereby increase the feedback frequency response of said integrator, the improvement wherein said threshold means includes: means for preventing response thereof to excursions in the amplifier output signal which are above said very low frequency range of concern and which exceed said amplitude threshold.

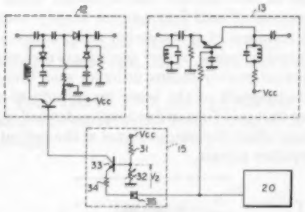
---

## 4,147,991
## AUTOMATIC GAIN CONTROL APPARATUS

**Sadayoshi Ijichi, and Yasutaka Shimada, both of Soma, Japan, assignors to Alps Electric Co., Ltd., Japan**

**Filed Sep. 26, 1977, Ser. No. 836,361**
**Claims priority, application Japan, Sep. 27, 1976, 51-115618**
**Int. Cl.[2] H03G 3/10**
**U.S. Cl. 330—284** **6 Claims**



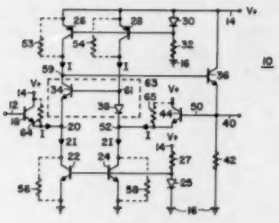




1. An automatic gain control apparatus comprising
an attenuator for attenuating input signals fed thereto from an antenna,
a high frequency amplifier receiving the output from said attenuator for amplifying said input signals,
AGC means for producing an automatic gain control signal,
means for supplying said automatic gain control signal to said high-frequency amplifier and said attenuator, and
switch means connected between said AGC means and said attenuator for selectively passing said automatic gain control signal to said attenuator, said switch means being adapted to supply said automatic gain control signal to said attenuator when the level of said input signal exceeds a predetermined value so as to start the operation of said attenuator.

## 4,147,992
## AMPLIFIER CIRCUIT HAVING A HIGH DEGREE OF COMMON MODE REJECTION

William F. Davis, Tempe, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 27, 1977, Ser. No. 864,176
Int. Cl.[2] H03F 1/34
U.S. Cl. 330—288 10 Claims



1. An amplifier circuit for providing an output signal at an output terminal thereof having a magnitude which precisely follows the magnitude of an input signal at an input terminal thereof, including in combination:

first current supply means having predetermined electrical characteristics and at least one terminal, said first current supply means being coupled to the output terminal of the amplifier circuit, said first current supply means causing a first undesired signal which tends to affect the output signal at the output terminal of the amplifier circuit;

second current supply means having electrical characteristics matched to said predetermined electrical characteristics of said first current supply means and at least one terminal, said second current supply means being coupled to the output terminal of the amplifier circuit, said second current supply means causing a second undesired signal having substantially the same magnitude as the first undesired signal which tends to affect the magnitude of the output signal at the output terminal of the amplifier circuit; and

signal cancellation circuit means having a current mirror means which responds to a current at a first terminal thereof to provide another current of substantially the same magnitude at a second terminal thereof, said first terminal of said current mirror means being coupled to said terminal of said first current supply means and said second terminal of said current mirror means being coupled to said terminal of said second current supply means, said current mirror means utilizing said first and second undesired signals of the same magnitude to cancel each other so that said first and second undesired signals do not adversely affect the output signal at the output terminal of the amplifier circuit.

---

## 4,147,993
## ELECTRICAL SIGNAL GENERATORS

Malcolm F. Sizmur, Ottershaw; David Brewerton, Bracknell, and Brian W. Mason, Birmingham, all of England, assignors to Racal-Dana Instruments Limited, England

Continuation of Ser. No. 707,958, Jul. 23, 1976, abandoned. This application Nov. 28, 1977, Ser. No. 855,300
Claims priority, application United Kingdom, Dec. 9, 1975, 50379/75
Int. Cl.[2] H03B 3/08
U.S. Cl. 331—1 A 11 Claims

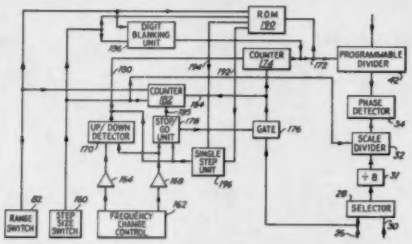
1. An electrical signal generator, comprising controllable oscillator means for producing a controlled frequency,

switchable dividing means connected to the oscillator means for dividing the controlled frequency to produce an output frequency,

range adjusting means connected to the switchable dividing means for switching the switchable dividing means to select a predetermined range for said output frequency,

step size control means for pre-selecting a desired size of incremental change in the output frequency independent of the value of the output frequency,

initiating means for initiating incremental changes in the output frequency, and



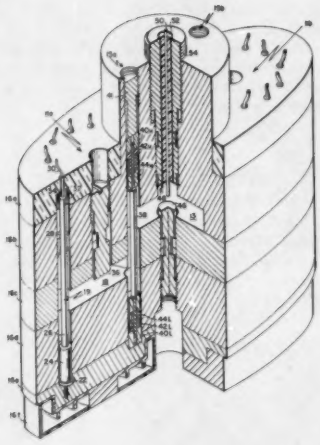
arithmetic means responsive to the step size control means and the range adjusting means and activated by operation of the initiating means for controlling the controllable oscillator to alter said output frequency in increments determined by the step size control means.

---

## 4,147,994
## POWER COMBINER

Glenn R. Thoren, Arlington; James L. Lampen, Burlington, and George Jerinic, Acton, all of Mass., assignors to Raytheon Company, Lexington, Mass.

Filed Jul. 31, 1978, Ser. No. 929,630
Int. Cl.[2] H03B 7/06
U.S. Cl. 331—56 5 Claims



1. A power combiner for radio frequency energy produced by a plurality of solid state diode oscillators, each one of such oscillators including an IMPATT diode in a coaxial line oscillator circuit, such combiner comprising:

(a) at least a pair of cylindrical cavities, each dimensioned to support the $TM_{010}$ mode of oscillation;

(b) means for mounting coaxial line oscillator circuits about a portion of the periphery of each one of the cylindrical cavities in a coupling relationship thereto;

(c) a central cylindrical cavity dimensioned to support a transverse magnetic mode of oscillation;

(d) a separate coaxial line disposed between a point on the

periphery of each one of the cylindrical cavities and the periphery of the central cylindrical cavity to couple each one of the cylindrical cavities to the central cylindrical cavity; and

(e) means for coupling radio frequency energy out of the central cylindrical cavity.

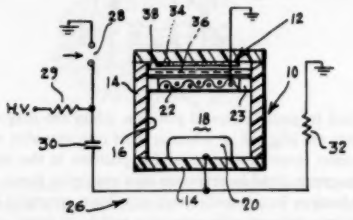
---

**4,147,995**

## FOIL MODERATED RADIOACTIVE PREIONIZATION SYSTEM FOR GAS LASERS

**Clare C. Leiby, Jr., Bedford, Mass., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed Aug. 19, 1977, Ser. No. 826,221**
**Int. Cl.[2] H01S** *3/09*
**U.S. Cl. 331—94.5 PE** **10 Claims**




1. In a gas laser having a resonant cavity and a pair of electrodes located within said cavity, the improvement therein comprises a radioactive source situated within said cavity and a thin metallic foil interposed between said radioactive source and at least one of said electrodes thereby forming a safe, radioactive preionization system for said gas laser.

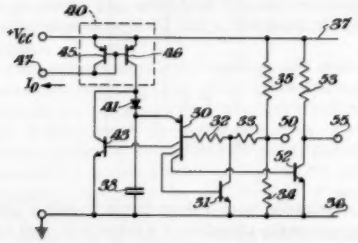
---

**4,147,996**

## CURRENT-CONTROLLED OSCILLATOR

**Walter S. Gontowski, Jr., Thompson, Conn., assignor to Sprague Electric Company, North Adams, Mass.**

**Filed Apr. 7, 1978, Ser. No. 894,304**
**Int. Cl.[2] H03K** *3/282*
**U.S. Cl. 331—111** **6 Claims**




1. A current-controlled oscillator comprising a first bipolar transistor of one polarity type; a second bipolar transistor of the other polarity type, one collector of said first transistor being connected to the base of said second transistor; the collector of said second transistor being connected to the base of said first transistor; a capacitor being connected between the emitters of said first and second transistors; a pair of d.c. voltage busses; a resistive voltage divider means being connected across said busses for establishing an intermediate d.c. voltage at said collector of said second transistor with respect to said busses, said emitter of said second transistor being connected to one of said busses; a diode; a variable current source having an output connected in the forward biased direction through said diode to said emitter of said first transistor; and a current gating means for shunting the output current from said current source around said diode and said capacitor when said first transistor is conducting.

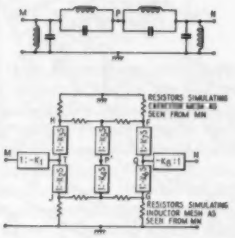
---

**4,147,997**

## ACTIVE FILTERS UTILIZING NETWORKS OF RESISTORS AND NEGATIVE IMPEDANCE CONVERTERS

**Alan J. Greaves, Needham Market, England, assignor to The Post Office, London, England**

**Filed Jun. 20, 1977, Ser. No. 808,090**
**Claims priority, application United Kingdom, Jun. 23, 1976, 26124/76**
**Int. Cl.[2] H03H** *7/02, 11/00*
**U.S. Cl. 333—214** **11 Claims**




9. An active filter including

a first set of resistors connected to form a first network having a ground connection and at least one terminal,

a second set of resistors connected to form a second network having a ground connection and at least one terminal,

a first generalized negative impedance converter having a conversion ratio effective to convert resistance into negative capacitance and connected from the terminal of the first network of resistors to a junction point,

a second generalized negative impedance converter having a conversion ratio effective to convert resistance into negative inductance and connected from the terminal of the second network of resistors to the junction point, and

input and output means connected to respective points selected from the junction point and the terminals of the first and second networks of resistors.

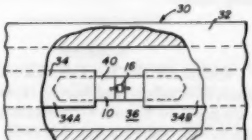
---

**4,147,998**

## BEAM LEAD ROD ASSEMBLY

**Thomas J. Russell, Sunnyvale, Calif., assignor to Krytar, Sunnyvale, Calif.**

**Filed Jul. 20, 1977, Ser. No. 817,185**
**Int. Cl.[2] H01P** *3/06, 1/00, 11/00, 5/04*
**U.S. Cl. 333—238** **10 Claims**




1. A beam lead rod assembly comprising:

a carrier including, a cylindrical dielectric body, and a pair of circumferential conductive coatings disposed on the surface of said body and separated by a circumferential gap of substantially uniform width extending about said body; and

a beam lead semiconductor device having a device portion

and a pair of oppositely extending leads, said device portion being disposed in said gap and each lead being conductively connected to one of said conductive coatings.

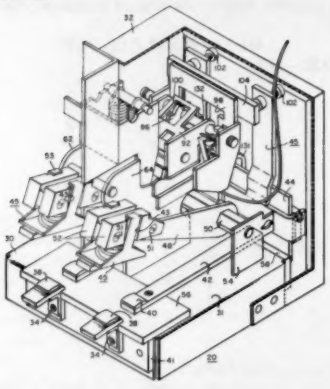
---

**4,147,999**

## CIRCUIT BREAKER

**Edgar R. Eley, Athens, Ga., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Dec. 19, 1977, Ser. No. 861,581**
**Int. Cl.[2] H01H *75/12***
**U.S. Cl. 335—35** **7 Claims**



1. A circuit breaker comprising:
first and second separable electrical contacts;
means for moving at least one of said first and second electrical contacts between a closed position wherein said first and second electrical contacts are disposed in registry to complete an electrical circuit therethrough and an open position wherein said first and second electrical contacts are spaced apart;
latch means for latching said moving means in said closed position;
bimetal actuating means, responsive to current flow, for unlatching said latch means when current flow through said first and second electrical contacts exceeds a selected trip level for a predetermined period of time; and
a magnetically-responsive trip pivotally mounted on said bimetal actuating means and having a first portion disposed in proximity to said bimetal actuating means to be drawn toward said bimetal actuating means when current flow through said bimetal actuating means exceeds a high current overload level and, also, having a second portion disposed in proximity with said latch means so as to unlatch said latch means when said first portion of said magnetically-responsive trip is drawn toward said bimetal actuating means.

---

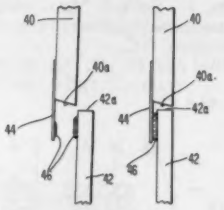
**4,148,000**

## REED SWITCH CONSTRUCTION

**Laimons Lacis, Bloomfield, and Steven Horvath, Irvington, both of N.J., assignors to Gordos Corporation, Bloomfield, N.J.**

**Division of Ser. No. 648,861, Jan. 14, 1976, Pat. No. 4,085,392.**
**This application Dec. 12, 1977, Ser. No. 859,823**
**Int. Cl.[2] H01H *1/08***
**U.S. Cl. 335—58** **8 Claims**

1. A reed switch employing magnetic elements of conductive, magnetic material, at least one of which is movable such that in the presence of a magnetic field said magnetic elements will move to a magnetic reluctance minimizing position in which position said elements are more nearly axially aligned but not contacting,
a rigid non-magnetic, non conductive enclosure through which said magnetic elements extend and by which said magnetic elements are supported in predetermined non-aligned position relative to each other,
a solid conductive extension on at least one of said magnetic elements conductively extending said element in position to alternately complete and break an electrical circuit through opposed contact areas on said extension and the other magnetic element which in closed contact position do not actually contact one another but are spaced apart a small distance, said contact areas being alternately designed to assume closed position when the magnetic elements are aligned or when at least one movable magnetic element assumes another stable position in the absence of a magnetic field in response to a restoring force, and



a conductive liquid within said envelope arranged to circulate into and out of a reservoir and to at least one of the opposed contact areas to fill the small distances between the contacts in closed positions and thereby complete a circuit through the magnetic elements.

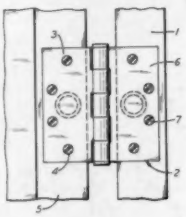
---

**4,148,001**

## ELECTRIC SWITCH-CONCEALING HINGE

**Joseph W. Gwozdz, Clark Summit, Pa., assignor to McKinney Manufacturing Company, Scranton, Pa.**

**Filed Oct. 28, 1977, Ser. No. 846,381**
**Int. Cl.[2] H01H *9/00***
**U.S. Cl. 335—205** **7 Claims**

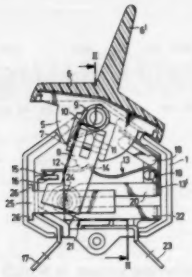


1. In combination with a door frame having a jamb and containing a normally closed door, a hinge with jamb and door leaves disposed between said jamb and adjacent edge of the door and secured thereto, the jamb having a hole extending into it from behind the jamb leaf of the hinge, the door having a hole extending into it from behind the door leaf of the hinge and aligned with the jamb hole while the door is closed, said hinge leaves concealing said holes from view, the back of said jamb leaf being provided with a recess facing the jamb hole, the back of the door leaf being provided with a recess facing the door hole, said recesses having front walls facing each other, a magnetically operated electric switch member frictionally held in said jamb hole and projecting into said jamb leaf recess, and a magnetic member frictionally held in said door hole and projecting into said door leaf recess, said switch and magnetic members being unattached to said hinge so that the hinge can be removed intact without disturbing them.

## 4,148,002
## ELECTRIC SWITCHES

Fritz Krasser, Altdorf, Fed. Rep. of Germany, assignor to Ellenberger & Poensgen GmbH, Altdorf, Fed. Rep. of Germany

Filed Nov. 30, 1976, Ser. No. 746,103
Claims priority, application Fed. Rep. of Germany, Dec. 29, 1975, 2558942
Int. Cl.[2] H01H 71/16
U.S. Cl. 337—74 5 Claims



1. In an electric switch including a housing; an openable and closable electric contact formed of a stationary contact held in the housing and an elongated contact spring clamped at one end in the housing and being urged away from the stationary contact by its resiliency; an operating lever pivotally supported in the housing for swinging in a direction generally parallel to the length dimension of the contact spring; a release lever carried by the operating lever for executing swinging motions in unison with the operating lever; the release lever including an operating cam affixed to the operating lever and cooperating with the contact spring for pressing the contact spring into engagement with the stationary contact in an on-position of the operating lever and for allowing the contact spring to move away from the stationary contact in an off-position of the operating lever, the improvement comprising

(a) a shaft held in said housing for pivotally securing said operating lever to said housing;

(b) securing means for pivotally mounting said release lever on said operating lever to provide for a swinging motion of said release lever with respect to said operating lever in a plane transverse to the length dimension of said contact spring;

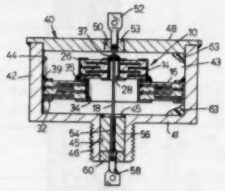
(c) a torque-exerting spring mounted on said shaft and having one end engaging said housing and having another end engaging said release lever eccentrically with respect to said securing means for urging said release lever into a normal position in which said cam is in an operative position relative to said contact spring and for urging said operating lever, with the intermediary of said release lever, into an off-position; and

(d) a bimetal strip held in said housing and having an actuating portion operatively connected to said release lever; said torque-exerting spring urging said release lever in the direction of said actuating portion; said bimetal strip having a normal position and a deformed position; in the normal position of said bimetal strip said cam being maintained in its operative position; said actuating portion of said bimetal strip being arranged to swing said release lever, as said bimetal strip assumes its deformed position, against the spring force exerted on the release lever, for moving said operating cam from its operative position transversely to the length dimension of said contact spring out of engagement therewith to allow said contact spring to move away from said stationary contact independently from the position of said operating lever.

## 4,148,003
## SERIES FEED-THROUGH CAPACITOR

Richard H. Colburn, Saugus; Donald A. Anderhalt, Valencia, and Robert A. Stevenson, Canyon Country, all of Calif., assignors to Globe-Union Inc., Milwaukee, Wis.

Filed Jul. 8, 1977, Ser. No. 813,784
Int. Cl.[2] H01H 7/14; H01G 4/42
U.S. Cl. 333—181 12 Claims



1. A series feed-through capacitor comprising:

a first discoidal capacitor having top and bottom discoid surfaces and an aperture extending through said discoid from said top surface to said bottom surface, said first capacitor including an outer circumferential portion having an outer terminal band secured thereto, said aperture having a periphery, an inner terminal band secured to said periphery, said terminal bands each having an overlapping edge portion covering less than a major portion of at least one of said discoid surfaces, and at least a pair of parallel spaced apart electrodes separated by a dielectric material, one of said paired electrodes being electrically connected to said outer terminal band and the other of said paired electrodes being electrically connected to said inner terminal band;

a second discoidal capacitor having top and bottom discoid surfaces and an aperture extending through said discoid from said top surface to said bottom surface and having an outer circumferential portion having an outer electrically conductive terminal band secured thereto, said aperture having a periphery having an inner electrically conductive terminal band secured thereto, said terminal bands each having an overlapping edge portion covering less than a major portion of at least one of said discoid surfaces, and at least a second pair of parallel spaced apart electrodes separated by a dielectric material, one of said second pair of electrodes being electrically connected to said outer terminal band of said second capacitor and the other of said second pair of electrodes being electrically connected to said inner terminal band of said second capacitor; and

said second discoidal capacitor being secured and electrically joined to said first discoidal capacitor, said capacitors having said overlapping edge portions of said outer terminal band of said second capacitor and said inner terminal band of said first capacitor physically directly joined in a juxtaposed contiguous relationship.

---

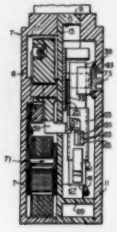
## 4,148,004
## CIRCUIT BREAKER WITH CALIBRATING MEANS

Francis L. Gelzheiser, Fairfield, Conn., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed May 4, 1977, Ser. No. 793,579
Int. Cl.[2] H01H 71/16
U.S. Cl. 337—82 4 Claims

1. A circuit breaker comprising an electrically insulating housing and including a box-like container and a cover therefor, a circuit breaker structure within the housing and comprising a pair of separable contacts operable between open and closed portions, a releasable member in an initial position and movable when released to a tripped position to effect automatic opening of the contacts and comprising an elongated current carrying bimetal for tripping the releasable member

when a predetermined current overload effects deflection of said bimetal in one direction from a latched position, a support frame within the housing for supporting the circuit breaker structure, the support frame comprising an outturned flange, a portion of the bimetal being fixedly mounted on the flange in surface-to-surface abutment, a rotatable calibrating plug operatively connected to the bimetal for rotating the bimetal between varying calibration modes, said plug comprising a bifurcated portion including spaced plug portions having a slot therebetween and through which the bimetal extends, and the plug portions extending in zones parallel to the axis of rotation of the plug to cause the slot and the bimetal to rotate in unison through similar angles.



---

**4,148,005**

## THERMOMETRIC TRANSDUCER DEVICE

**Lawrence E. Larsen, Silver Spring, and John H. Jacobi, Bowie, both of Md., assignors to United States of America as represented by the Secretary of the Army, Washington, D.C.**

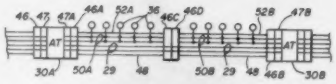
**Filed Oct. 14, 1977, Ser. No. 842,138**
**Int. Cl.[2] H01C 7/04**
**U.S. Cl. 338—28** **12 Claims**

1. A thermoelectric transducer device for measuring the temperature of a dielectric exposed to microwave radiation during such exposure, said device including a transducer electrode sub-assembly comprising an elongate substrate, a sensor means, mounted at one end of the substrate, for sensing the temperature of the dielectric object and converting the temperature sensed into an electrical signal in accordance therewith, and conductor means extending along the length of said substrate for connecting the sensor means to a transmission line for transmitting the said electrical signal for processing by measurement instrumentation, said conductor means comprising at least four conductors whose impedance varies along the length thereof so as to provide electrothermal matching of the transducer electrode sub-assembly to the dielectric object so that the transducer electrode sub-assembly acts neither as a heat source nor a heat sink with respect to the dielectric object during the exposure of the dielectric object to microwave radiation.

**4,148,006**

## SEISMIC CABLE FOR USE WITH ARRAY TERMINAL TYPE ACQUISITION SYSTEMS

**Edward C. Kelm, Pasadena, Calif., assignor to Geophysical Systems Corp., Pasadena, Calif.**

**Filed Sep. 19, 1977, Ser. No. 834,817**
**Int. Cl.[2] G01V 1/16**
**U.S. Cl. 340—15.5 TS** **5 Claims**

1. In a seismic data gathering system in which a plurality of S geophones are connected by analog conductor pairs into each of a plurality of T array terminals (AT), providing a total of TS geophones, the ATs are spaced along a line a distance D apart, and the S geophones for each of the T ATs are spaced uniformly along the line of ATs at distances D/S apart, and in the ATs the S pairs of analog conductors carry S geophone signals which are amplified, digitized, the digital bits are stored, and on command, are read out of storage as a train of digital bits over a digital conductor pair to and through the next downline AT and to a recording unit; the improvement in cable system comprising;

(a) a first AT, and a second spaced-apart AT next downline toward a recording unit, and a third spaced-apart AT next upline toward the end of the line farthest from said recording unit, each of said ATs having two identical ports and identical receptacles in each port;

(b) a first cable connected to a first port in said first AT and connected to a first port in said second AT; and a second identical cable connected to the second port in said first AT and connected to a first port in said third AT;

(c) said first cable containing at least one digital conductor pair and S/2 analog conductor pairs connected to said first port in said first AT and connected respectively to S/2 geophones positioned D/S apart downline toward said second AT, and spaced substantially a total distance D/2 downline from said first AT;

(d) said second cable, containing at least one digital conductor pair and S/2 analog conductor pairs connected to said second port in said first AT, and connected respectively to S/2 geophones positioned upline D/S apart toward said third AT, and spaced substantially a total distance of D/2 upline from said first AT;

whereby the minimum number of analog conductor pairs entering eacb port is S/2 , one group of S/2 conductor pairs extending D/2 downline, and a second group of S/2 conductor pairs extending D/2 upline from said first AT;

(e) said first and second cables are identical and can be turned end for end, and each comprises a bundle of at least one digital conductor pair, plus S/2 analog conductor pairs, said S/2 analog conductor pairs being cut at the midpoints of said cables while said at least one digital conductor pair is continuous from one end of said cable to the other;

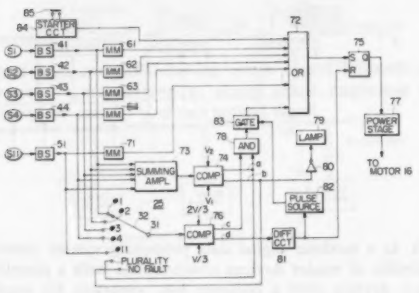
whereby the S spaced geophones positioned between each pair of ATs, are connected half into each of the two adjacent ATs, and said at least one digital conductor pair is connected continuously between adjacent ATs.

4,148,007

## SERIAL-INDICATION FAULT DISPLAY SYSTEM FOR VEHICLES

Shigeru Okabayashi; Kousaku Baba, both of Yokohama, and Hiroshi Endô, Yokosuka, all of Japan, assignors to Nissan Motor Company, Limited, Japan

Filed Jan. 5, 1978, Ser. No. 867,039
Claims priority, application Japan, Jan. 13, 1977, 52-1894
Int. Cl.[2] G08B 19/00
U.S. Cl. 340—52 F 11 Claims




1. A fault display system for motor vehicles, comprising in combination:

a plurality of sensors located in a vehicle, each sensor providing a first signal in response to the detection of a predetermined sensed condition of a vehicle component being monitored;

first voltage sensing means connected to said sensors for generating a second signal representative of the presence of at least two of such sensed conditions;

a plurality of first voltage sense terminals associated with said sensors to receive said first signals on respective terminals and a second voltage sense terminal connected to receive said second signal;

second voltage sensing means selectively connected to said sense terminals for detecting the presence of said first and second signals on said terminals;

means for visually indicating a selected one of a plurality of visual representations corresponding to said first and second terminals;

drive means for driving said visual indicating means for selectively displaying one of said visual representations and driving said second voltage sensing means in association with said visual indicating means for selective connection to said sense terminals; and

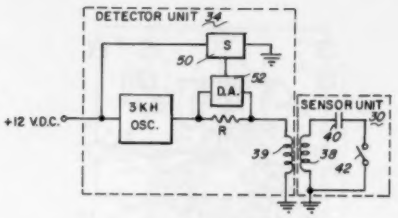
drive control means responsive to the occurrence of said first signal from a said sensor for energizing said drive means and responsive to the detection of a said first signal on said voltage sense terminal associated with said sensor for de-energizing said drive means to allow said indicating means to display said visual representation associated with said terminal, said drive control means including timing means for re-energizing said drive means after the elapse of a predetermined interval in response to the detection of the lastmentioned first signal in the presence of said second signal, said timing means being inhibited in response to the detection of said second signal on said second voltage sense terminal to allow said indicating means to display a visual representation associated with said second terminal.

4,148,008

## TIRE PRESSURE MONITORING SYSTEM

Joe F. Lusk, Box 88, and William H. Rood, Box 122, both of W. Campton, N.H. 03228

Filed Sep. 29, 1977, Ser. No. 837,915
Int. Cl.[2] B60C 23/02; G08B 23/00
U.S. Cl. 340—58 12 Claims




1. A condition monitoring system comprising;

means for generating an alternating test signal,

first means including a monitoring switch means and first inductive coupling means,

second inductive coupling means in periodic relative alignment and with the first inductive coupling means,

means conveying the alternating test signal to the second inductive coupling said test signal means including resistive means coupling directly to the second inductive coupling means,

and means for sensing current flow through the second inductive coupling means coupled from the resistive means and responsive to a change in current flow through the resistive means,

whereby the condition of said switch means is determined by the sensing of a low or negligible current when the switch means is open and a reflected higher current when the switch means is closed.

11. A condition monitoring system comprising;

means for generating an alternating test signal,

first means including a monitoring switch means, first inductive coupling means, and a capacitance means forming a tank circuit when said switch means is closed, having a predetermined resonant frequency,

second inductive coupling means in periodic relative alignment with the first inductive coupling means,

a load device,

means defining a first path for conveying the alternating test signal to both the load device and the second inductive coupling means,

means defining a second path having a charging circuit and opposite polarity detectors for sensing the opposite charge condition of the charging circuit,

said charging circuit being charged to one polarity upon failure of the load device and to an opposite polarity upon operation of said switch means.

---

4,148,009

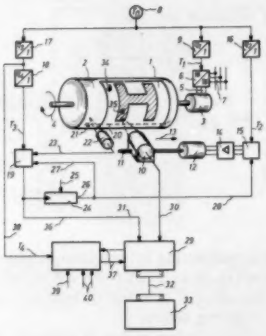
## METHOD AND APPARATUS FOR ELECTRONICALLY RETOUCHING

Helge Witthandt, Kiel, Germany, assignor to Dr. Ing. Rudolf Hell, GmbH, Fed. Rep. of Germany

Filed Sep. 12, 1977, Ser. No. 832,233
Claims priority, application Fed. Rep. of Germany, Sep. 17, 1976, 2641835
Int. Cl.[2] G06K 9/12
U.S. Cl. 340—146.3 H 8 Claims

1. A method of electronically retouching a pattern in connection with the production of recording data relating thereto, comprising the steps of electro-optically scanning the pattern in a dot and image line fashion to form an electrical image signal from a sequence of alternating scanning conditions which respectively represent the black and white segments of

a scanned image line, establishing a minimum length for respective conditions, in the form of an electrical signal, comparing each electrical signal, representing a respective scanned condition, with the electrical signal representing the corresponding established minimum length, transforming an image signal representing a condition having a lesser length than the corresponding established minimum length, comprising a defect, into a signal representing the alternate condition immediately preceding such defect condition, thereby forming a continuation of such preceding condition, with the condition immediately following such defect condition likewise being of such alternate condition and thus representing a completion of the corresponding condition preceding the defect, with such total of three successive conditions representing a retouched pattern segment.



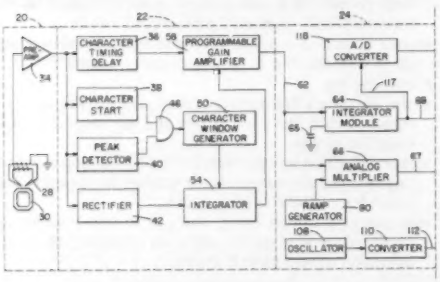
---

**4,148,010**

## MAGNETIC INK CHARACTER READER SYSTEM

**Chin-Chih Shiau, Kitchner, Canada, assignor to NCR Canada Ltd. - NCR Canada Ltee, Mississauga, Canada**

**Filed Oct. 31, 1977, Ser. No. 846,878**
**Int. Cl.[2] G06K *9/18***
**U.S. Cl. 340—146.3 C** **23 Claims**




1. In a character reading system wherein an analog voltage having a waveform unique to each character to be read is generated, said unique waveform including a sequence of varying peak amplitudes corresponding to the shape of the character being read, means for evaluating said waveform to derive signals representing feature characteristics of the character recognized comprising:

a. means for generating timing signals defining a plurality of character scan segments each corresponding to a time of occurrence of one of said peak amplitudes;

b. means operated in response to the generation of said timing signals for sampling said waveform during each scan segment to output a feature signal in accordance with the peak amplitude sampled;

c. and means for generating an analog value representing the center of gravity of each of said peak amplitudes for use in controlling said timing generating means to output timing signals establishing the next succeeding character scan segment.

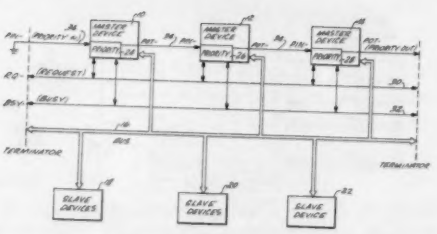
---

**4,148,011**

## ASYNCHRONOUS PRIORITY CIRCUIT FOR CONTROLLING ACCESS TO A BUS

**Angus McLagan, Newport Beach, and Kirk B. Cummings, Whittier, both of Calif., assignors to General Automation, Inc., Anaheim, Calif.**

**Filed Jun. 6, 1977, Ser. No. 803,448**
**Int. Cl.[2] G05B *23/00*; G06F *9/00*; H04Q *3/00***
**U.S. Cl. 340—147 LP** **4 Claims**




1. In a modular digital data processing system wherein a plurality of master devices communicate with a plurality of slave devices over a common bus, apparatus for resolving priority among the master devices when more than one is seeking access to the bus, comprising: a priority circuit in each device, first and second control conductors connected to each of said circuits, priority conductor means connecting the priority circuits in series starting with a first master device and terminating at a last master device in sequence, means in each device for initiating a local access request signal when access to the bus is required, means responsive to said initiating means for applying a request signal on the first control conductor to each of the priority circuits indicating a request has been initiated, each priority circuit including means responsive to the request signal on the first control conductor and a priority signal received on the priority conductor means from the previous device in the series for generating a control signal, said means generating the control signal including clock means for providing a predetermined fixed delay between the time the request signal on the first control line and the priority signal on the priority conductor are received and the time the control signal indicates they have been received, means responsive to the delayed control signal for sending a priority signal to the next device in series after said predetermined delay, and means responsive to the local request signal and the delayed control signal for applying a busy signal to the second control conductor when a local request is present and the delayed control signal indicates the priority signal has been received.

---

**4,148,012**

## ACCESS CONTROL SYSTEM

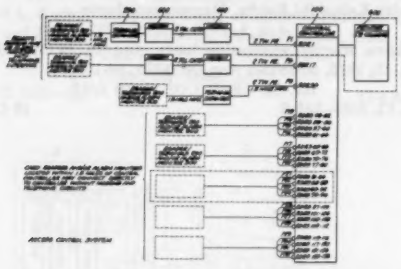
**Paul A. Baump, Canoga Park; Don Lyu, Los Angeles; Jerry T. Sain, Thousand Oaks, and Richard A. Zbriger, Canoga Park, all of Calif., assignors to Greer Hydraulics, Inc., Los Angeles, Calif.**

**Filed Sep. 26, 1975, Ser. No. 617,232**
**Int. Cl.[2] H04G *3/00***
**U.S. Cl. 340—149 A** **23 Claims**

1. An access control system responsive to an access signal comprising:

a central processing unit, at least one card reader terminal, said card reader terminal comprising at least one first signal generating means for transmitting a first signal responsive to the presence of a proper first code on a card key; said first signal enabling at least one reading means

for reading and transmitting to said CPU a second signal, said second signal corresponding to a second code on said



card key, said CPU having access signal transmitting means for transmitting an access signal responsive to receipt by said CPU of said second signal.

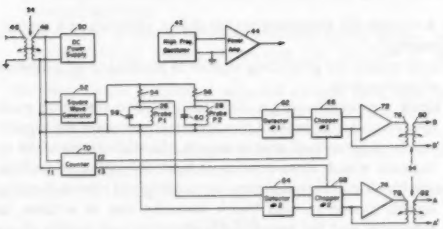
---

**4,148,013**

## ROTATING SHAFT ALIGNMENT MONITOR

**Albert E. Finn, Marblehead, and Haskell Ginns, Belmont, both of Mass., assignors to The Indikon Company, Inc., Watertown, Mass.**

**Filed Dec. 19, 1975, Ser. No. 642,599**
**Int. Cl.[2] G08C *25/00, 19/04, 19/08***
**U.S. Cl. 340—189 M** **10 Claims**



1. A system for detecting the misalignment between two or more co-rotating, in-line shafts comprising:

first and second co-rotating, in-line shafts;

sensor means rotating with said shafts and positioned to sense a parameter varying with rotation angle of said shafts and representative of the degree of misalignment of the axes of said first and second shafts;

means associated with at least one of said first and second co-rotating shafts and rotating therewith for coupling energization to said sensor, whereby said sensor means provides a signal representative of said degree of misalignment;

means for coupling the signal of said sensor means representative of the degree of misalignment of said first and second shafts therefrom; and

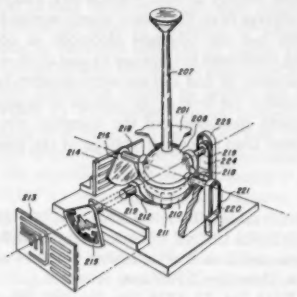
means responsive to the coupled signal representative of the degree of misalignment for providing an output representation thereof.

**4,148,014**

## SYSTEM WITH JOYSTICK TO CONTROL VELOCITY VECTOR OF A DISPLAY CURSOR

**David C. Burson, Garland, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Apr. 6, 1977, Ser. No. 785,143**
**Int. Cl.[2] G06F *3/14***
**U.S. Cl. 340—709** **6 Claims**



1. A video display system comprising:

(a) at least one joystick control having a shaft member which is moveable from a central position in any direction of an X-Y plane, said joystick control including means for generating X-coordinate and Y-coordinate data signals indicative of the position of said shaft member in said X-Y plane;

(b) processor means coupled to said joystick control for receiving said X and Y coordinate data signals, said processor means including:

(i) means for computing the directional vector between the X-Y coordinates of the shaft member, and said central position, and

(ii) means responsive to the relative distance of the joystick from central position as determined from said X-Y coordinate data for selecting a corresponding speed; and

(c) video signal generator means coupled to said processor means, said video signal generator means being controlled by said processor means to move a cursor across the video display along the computed vector at said selected speed.

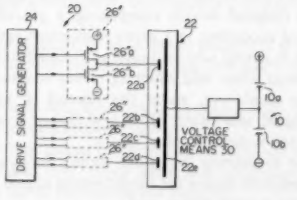
---

**4,148,015**

## ELECTRONIC TIMEPIECE WITH AN ELECTROCHROMIC DISPLAY

**Fukuo Sekiya; Heihachiro Ebihara, and Katsuo Nishimura, all of Tokorozawa, Japan, assignors to Citizen Watch Co., Ltd., Tokyo, Japan**

**Filed Oct. 18, 1976, Ser. No. 733,491**
**Claims priority, application Japan, Oct. 24, 1975, 50/127923; Oct. 28, 1975, 50/128872**
**Int. Cl.[2] G09F *9/32***
**U.S. Cl. 340—763** **4 Claims**




1. A driver circuit for an electrochromic display device for an electronic timepiece and having segment electrodes and a

common electrode connected to a power supply having high and low potentials, comprising:

means for generating drive signals; and

a plurality of first and second metal oxide semiconductor field effect transistors having their drain electrodes connected to the high and low potentials of said power supply and having their source electrodes connected together and also connected to the segment electrodes of the electrochromic display device, respectively, and operative to apply a voltage from the power supply across the segment electrodes and the common electrode in coloring and bleaching directions in response to said drive signals, each of said plurality of first and second transistors being operative to control the level of the voltage to be applied across the segment electrode and the common electrode to a value lower than an output voltage of the power supply.

---

**4,148,016**

## DIGITAL TO ANALOG AND ANALOG TO DIGITAL CONVERTERS USING CCD RAMP GENERATOR

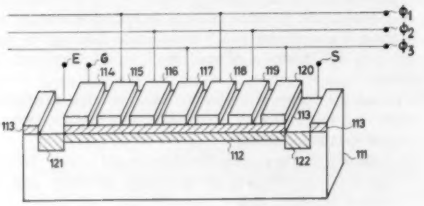
**Etienne Alizon, and Jean E. Picquendar, both of Paris, France, assignors to Thomson-CSF, Paris, France**

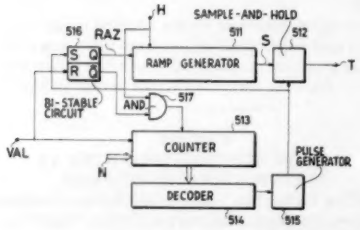
**Filed Jun. 22, 1976, Ser. No. 698,784**

**Claims priority, application France, Jun. 27, 1975, 75 20394**

**Int. Cl.[2] H03K *13/02***

**U.S. Cl. 340—347 DA** **8 Claims**




1. A digital-analog converter for converting a digital signal consisting of n bits into an analog signal, which comprises:

means for counting an external clock signal composed of pulses, and delivering a stop signal when the count obtained is equal to the value of said digital signal;

a charge coupled device comprising a plurality of cells weighted according to a given conversion law;

means for injecting into said charge-coupled device at least one charge when said counting means is actuated;

means for displacing, under the control of said external clock signal, said charge along said charge-coupled device under said weighted cells;

means for measuring weighted signals induced into said weighted cells during the displacement of said charge, and providing a ramp signal; and

a sample-and-hold circuit for sampling said ramp signal under the control of said stop signal, and delivering said analog signal.

---

**4,148,017**

## DEVICE FOR DETECTING A KEY SWITCH OPERATION

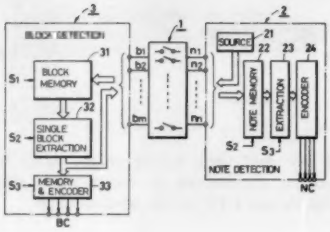
**Norio Tomisawa, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan**

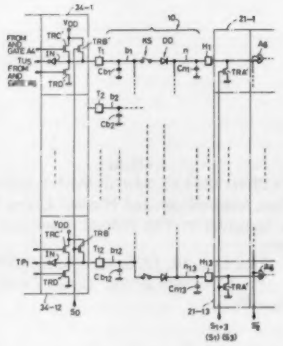
**Filed Aug. 9, 1976, Ser. No. 712,815**

**Claims priority, application Japan, Aug. 15, 1975, 50-99151; Aug. 15, 1975, 50-99152; Aug. 20, 1975, 50-100877**

**Int. Cl.[2] G06F *3/02*; G10B *3/12***

**U.S. Cl. 340—365 S** **10 Claims**




8. A system for detecting actuated key switches in a matrix, comprising:

source means for providing signals in parallel to all columns of said matrix,

a block memory having a storage cell associated with each row of said matrix, said block memory storing the signals received from said source means via said matrix so as to indicate which rows contain at least one actuated switch,

single block extraction means for reading out row-indicating signals stored in said block memory one at a time, in sequence, and for providing a signal to said matrix along the single row corresponding to the currently read-out row-indicating signal,

a note memory having a storage cell associated with each column of said matrix, said note memory storing signals received from said block extraction means through said matrix so as to indicate which columns in said single row contain actuated switches,

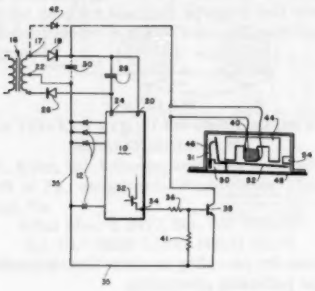
note extraction means for reading out column-indicating signals from said note memory one at a time, in sequence, each such read out column-indicating signal and the concurrently read out row-indicating signal together uniquely identifying a corresponding actuated switch in said matrix, and

timing control means connected to said block extraction means and to said note extraction means, for causing said single block extraction means to read out the next sequential row-indicating signal only after all of the column-indicating signals for said single row have been read out by said note extraction means.

## 4,148,018
## ALARM SOUNDER FOR A.C. OPERATED SOLID STATE DEVICES

**Ronald L. Koepp, Sunnyvale, Calif., assignor to Fairchild Camera and Instrument Corporation, Mountain View, Calif.**

**Filed Jun. 3, 1977, Ser. No. 803,096**
**Int. Cl.[2] G08B 3/00**
**U.S. Cl. 340—401** **12 Claims**



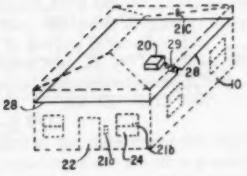
1. An alarm sounder for use with alternating current (A.C.) powered circuitry having signalling means for producing an alarm output signal, said alarm sounder comprising:
a housing;
a laminated magnetic core located within said housing;
a coil wound around part of said core;
electronic circuit means connected in series with said coil and operable by said signalling means for supplying an unfiltered first direct current (D.C.) with a first A.C. ripple component to said coil;
a reed positioned adjacent to said core, said reed forming part of the magnetic circuit of said core and being magnetically attracted toward said core by said first D.C. flowing through said coil;
spring means contacting said reed during selected time periods and exerting sufficient force on said reed to overcome the magnetic attraction caused by said first D.C. flowing through said coil;
spring-retaining means for mounting said spring means, said spring-retaining means contacting the interior of said housing; and
sounding means positioned adjacent to said reed, said first A.C. ripple component through said coil generating an alternating core flux that causes said reed to vibrate audibly against said sounding means at the frequency of said first A.C. ripple component.

---

## 4,148,019
## SECURITY ALARM TRANSMISSION SYSTEM

**John E. Durkee, Ft. Atkinson, Wis., assignor to Thomas Industries Inc., Ft. Atkinson, Wis.**

**Filed Mar. 5, 1975, Ser. No. 555,550**
**Int. Cl.[2] G08B 19/00**
**U.S. Cl. 340—531** **16 Claims**



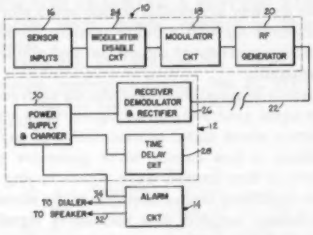
1. In a security alarm system for a protected area, communicating apparatus comprising a plurality of transmitter units in said protected area, each of said transmitter units including condition sensing means and a transmitter circuit controlled by its associated sensing means to provide an information signal in response to a change in a condition as sensed by its associated sensing means, receiver means at said protected area, and signal coupling means including conductor means extending around the periphery of the area protected in a loop and having first and second ends connected to respective first and second inputs of said receiver means, said conductor means defining a controlled area of influence in which inductive signal coupling is provided between an output stage of each transmitter circuit located within said controlled area of influence and said conductor means to permit the information signals provided by transmitter circuits located within said controlled area of influence to be inductively coupled over said conductor means to said receiver means connected thereto and to limit the response of said receiver means to information signals provided by transmitter circuits located within said controlled area of influence, detecting means in said receiver means for detecting information signals coupled to said receiver means over said conductor means, and means controlled by said detecting means to provide an indication of the change in a monitored condition.

---

## 4,148,020
## FAIL-SAFE ALARM SYSTEM UTILIZING FREQUENCY MODULATED SIGNAL DETECTION

**Dennis K. Siemer, 217 Viking Dr., and Swen E. Farland, Rte. 5, Box 100, both of Mankato, Minn. 56001**

**Filed Aug. 22, 1977, Ser. No. 826,654**
**Int. Cl.[2] G08B 13/22**
**U.S. Cl. 340—531** **9 Claims**



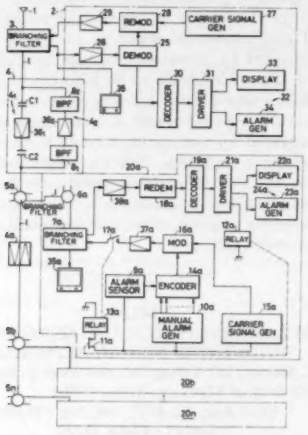

1. An alarm system for monitoring selected conditions at a remote location and providing a signal representative of the presence or absence of an alarm condition at the monitored location or power failure at either monitored or monitoring location, comprising:
(a) a transmitter at said monitored location, said transmitter comprising:
(i) frequency generator means for continuously generating a first output signal at a predetermined nominal frequency;
(ii) means for modulating the frequency of said first output signal;
(iii) means responsive to an alarm condition at said monitored location for disabling said frequency modulating means;
(b) a receiver at said monitoring location connected to said transmitter, said receiver comprising:
(i) first circuit means for detecting the absence of modulation of said first output signal and generating a second output signal representative thereof;
(c) second circuit means responsive to said second output signal of said first circuit means and to loss of power for generating a time-delayed signal representative of said alarm condition or loss of power.

**4,148,021**

## ALARM SYSTEM UTILIZING BIDIRECTIONAL WIRED TELEVISION SYSTEM

**Masakatsu Watanabe, Akatsukashin, Japan, assignor to Hochiki Corporation, Tokyo, Japan**

**Filed Sep. 7, 1977, Ser. No. 831,316**
**Claims priority, application Japan, Sep. 8, 1976, 51-107579**
**Int. Cl.[2] G08B *1/08***
**U.S. Cl. 340—531** **7 Claims**




**1**. An alarm system utilizing a bidirectional wired TV system which is constructed to transmit a TV signal received by a community antenna to a central station and a plurality of subscribers' stations through a bidirectionally transmissible line interconnecting said central station and said plural subscribers' stations, wherein:

said plurality of subscribers' stations are each provided with alarm signal generating means operative to generate a low frequency alarm signal representative of any emergency condition, a first carrier wave generator operative to generate a first carrier wave signal having a predetermined frequency higher than that of the alarm signal, and a modulator coupled with said alarm signal generating means and first carrier wave generator to modulate said first carrier wave signal with said alarm signal;

said central station is provided with a demodulator operative to receive and demodulate the modulated alarm signal transmitted from that of said plurality of subscribers' stations which is generating the alarm signal through said bidirectionally transmissible line, a first alarm signal identifying means coupled to said demodulator for identifying the emergency condition represented by the demodulated alarm signal from said demodulator, a second carrier wave generator operative to generate a second carrier wave signal having a predetermined high frequency different from that of said first carrier wave signal and a remodulator coupled to said demodulator and second carrier wave generator for remodulating the second carrier wave signal with the demodulated alarm signal from said demodulator; and

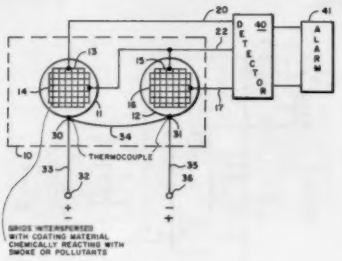
at least one of said plurality of subscribers' stations is further provided with a redemodulator operative to receive and remodulate the remodulated alarm signal from said remodulator through said bidirectionally transmissible line, and a second alarm signal identifying means coupled with said redemodulator to identify the emergency condition represented by the redemodulated signal from said second demodulator.

**4,148,022**

## CHEMICAL SMOKE OR POLLUTANT DETECTOR

**Frank W. Hetznecker, Buffalo Grove, Ill., assignor to Honeywell Inc., Minneapolis, Minn.**

**Filed Apr. 28, 1977, Ser. No. 792,092**
**Int. Cl.[2] G08B *17/10***
**U.S. Cl. 340—628** **23 Claims**




**1**. A system for providing an alarm function in the presence of smoke or pollutants comprising:

a sensor having

first and second conductors in non-electrical contact,

a coating material interspersed between and among said first and second conductors, said coating material chemically reacting with by-products of combustion or pollutants to affect conductivity between said first and second conductors;

power supply means for supplying power to said first and said second conductors;

detector means connected to said first and second conductors for providing an output signal upon the presence of smoke; and,

alarm means responsive to said output signal for providing an alarm indication.

**5**. A sensor for chemically sensing smoke or pollutants comprising:

first and second conductors in non-electrical contact, said first and second conductors adapted to be connected to a source of power; and,

a coating material interspersed between and among said first and second conductors, said coating material chemically reacting with byproducts of combustion to affect conductivity between said first and second conductors.

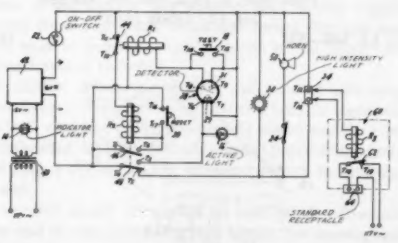
---

**4,148,023**

## EMERGENCY EXIT INDICATOR

**Barry Elkin, New York, N.Y., assignor to E.D.I. Safety Devices, Inc., Greenlawn, N.Y.**

**Filed May 2, 1977, Ser. No. 792,809**
**Int. Cl.[2] G08B *17/10, 7/00***
**U.S. Cl. 340—628** **8 Claims**




**1**. An emergency exit indicator comprising: power supply means, door location signaling means, smoke detecting means operatively connecting said power supply means to said door

location signaling means, said smoke detecting means including a smoke detector assembly and switching means actuated by said smoke detector assembly, said switching means including means for switching said indicator from a detecting condition wherein said power supply means in interruptably connected to said door location signaling means through said smoke detecting means to a triggered condition wherein said power supply is directly operatively connected to said door locating signaling means bypassing said smoke detecting means responsive to the detection of a predetermined level of smoke by said smoke detector assembly whereby said door location signaling means remains actuated until said switching means is manually reset.

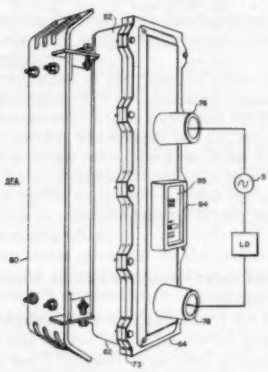
---

**4,148,024**

## CAPACITIVELY COUPLED INDICATOR FOR A SUBMERSIBLE FUSE

**Edmund W. Kuhn, Mt. Lebanon, and Allan I. Bennett, Murrysville, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Mar. 2, 1977, Ser. No. 773,459**
**Int. Cl.[2] G08B *21/00*; H01H *85/30***
**U.S. Cl. 340—638** **10 Claims**



1. A fuse, comprising:

a. enclosure means having a pair of spaced terminals thereon which extend from the inside portion of said enclosure means to the outside portion thereof, said enclosure means comprising dielectric material;

b. fuse means disposed within said enclosure means, said fuse means being protected by said enclosure means, said fuse means being serially connected to said pair of terminals; and

c. indicator means disposed outside of said enclosure means for indicating when said fuse means has blown; said indicator means being capacitively connected with said fuse means through said dielectric material of said enclosure means for so indicating.

---

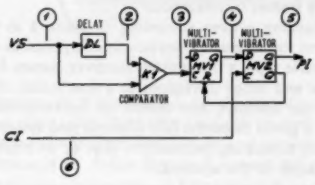
**4,148,025**

## APPARATUS FOR DETECTING ECHO SIGNALS

**Ole S. Seiersen, Kokkedal, Denmark, assignor to Christian Rovsing A/S, Herlev, Denmark**

**Filed Mar. 23, 1977, Ser. No. 780,448**
**Claims priority, application Denmark, Mar. 24, 1976, 1296/76**
**Int. Cl.[2] G01S *9/02***
**U.S. Cl. 343—5 VQ** **3 Claims**

1. An apparatus for detecting echo signals produced by reflection of pulses transmitted with a given time period T and a given pulse width $\tau$, characterized by means (SPF) for determining, with a resolution of t/M wherein t is essentially equal to the pulse width $\tau$ and M is at least three, signal positions within each of a predetermined number N of consecutive, constantly changing equidistant intervals with the period T and the length t, and for producing, for each signal position ascertained, a secondary signal (PI) in a corresponding resolution interval of t/M, and means (DL1–DL(M-1), VK1–VKM, SUM) for currently summing up the secondary signals produced in the last N-M resolution intervals with such weighting that the individual secondary signals in a set of M resolution intervals are given in a weight which depends on their distance from the central resolution interval of the set, said weight decreasing with increasing distance, wherein said means for




determining signal positions comprise a delay circuit (DL) and a comparator (K1) connected therewith, said comparator producing a binary output signal (3) which changes condition every time the delayed signal (2) and the non-delayed signal (1) assume identical value, and that said signal (3) is supplied to a trigger circuit (MV1, MV2), to which clock pulses (CI) are also supplied and which is arranged in such a way that it issues, with each shift in one direction of the output signal of the comparator, a position pulse (PI) beginning at the first clock pulse after the shift and having a duration of one clock pulse period, said position pulse forming said secondary signal.

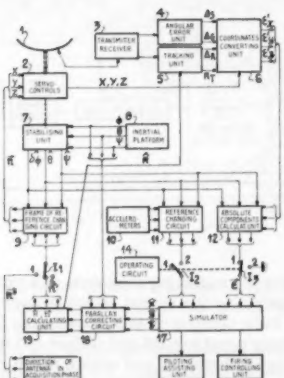
---

**4,148,026**

## SYSTEM FOR TRACKING A MOVING TARGET

**Robert Gendreu, Paris, France, assignor to Thomson-CSF, Paris, France**

**Filed Jan. 17, 1978, Ser. No. 870,250**
**Claims priority, application France, Jan. 21, 1977, 77 01740**
**Int. Cl.[2] G01S *9/22, 9/62, 9/66***
**U.S. Cl. 343—5 ST** **23 Claims**




1. A system for tracking a moving target which comprises, on board an also moving carrier, an arrangement for measuring deviation relating to the target in a first frame of reference related to the measuring arrangement, means for servo-controlling the aiming of the arrangement, and means for controlling these servo-controls on the basis of the measurements of deviation, wherein said control means comprise:

means for converting said measurements of deviation into new values for deviation referred to a second frame of

reference whose orientation is substantially unvarying and whose origin is situated close to the instantaneous center of rotation of the carrier distance from the origin of the first frame of reference;

means for processing said values by integration which supply in particular the estimated position of the target; and,

means for conversion in the opposite direction which supply the said position in the first frame of reference for the servo-controls, said means for conversion in the opposite direction including means for correcting for the parallax due to said distance between the origins of the first and second frames of reference.

23. A tracking system according to claim 1 in which the arrangement for measuring deviations comprises an antenna of the monopulse type, a transmitter/receiver, means for measuring angular and range deviations in a first frame of reference related to the antenna, and means for servo-controlling the antenna in a given direction $(\vec{n})$, wherein said system includes:

means for measuring parameters $(\delta\phi, \dot{\theta}, \dot{\psi})$ relating to the orientation of the antenna,

means for calculating said measurement parameters relating to the orientation of the antenna into Cartesion co-ordinates referred to a second frame of reference or substantially unvarying orientation whose origin is situated substantially at the instantaneous center of rotation of the carrier;

means for simulating the trajectory of the target in said second frame of reference;

means for calculating the estimated range $(\hat{R})$ and the estimated direction $(\vec{n}')$ of the target in said second frame of reference; and

means for calculating the direction $(\vec{n})$ of the target in the first antenna related frame of reference on the basis of the direction $(\vec{n}')$, in order to operate the servo-controls.

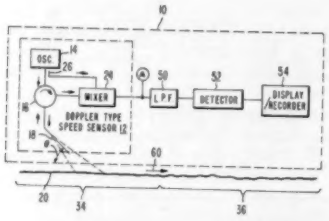
---

## 4,148,027

## SURFACE ROUGHNESS MEASURING APPARATUS

**Markus Nowogrodzki, Sussex, N.J., assignor to RCA Corporation, New York, N.Y.**

**Filed Mar. 27, 1978, Ser. No. 890,802**
**Int. Cl.[2] G01S 9/02**
**U.S. Cl. 343—5 SA** **4 Claims**




1. In a system for measuring roughness of a surface having movement relative to the system which includes a doppler speed sensing radar comprising an antenna means for radiating a radio frequency signal toward said surface and receiving the back scatter signal therefrom and mixing means producing a signal which represents the difference frequency between the frequencies of said radiated and back scattered signals, said difference signal being comprised of a frequency spectrum including the doppler frequency, $f_D$, associated with the relative speed of said system and frequencies below the doppler frequency which are associated with the roughness of said surface comprising in combination:

means responsive to said difference frequency for producing a signal which is a function of the energy contained in said frequencies below the doppler frequency; and

means responsive to said energy function signal for at least one of recording and displaying an indication thereof which is an indication of the roughness of said surface.

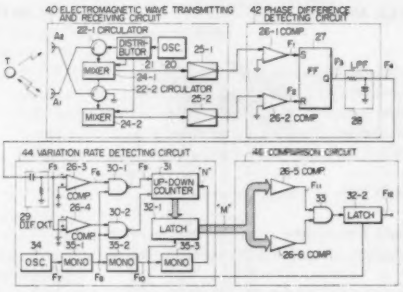
---

## 4,148,028

## RADAR SYSTEM FOR AN ANTI-COLLISION SYSTEM FOR A VEHICLE

**Norio Fujiki, Yokohama, Japan, assignor to Nissan Motor Company, Limited, Japan**

**Filed Aug. 2, 1977, Ser. No. 821,227**
**Claims priority, application Japan, Aug. 3, 1976, 51-92016**
**Int. Cl.[2] G08G 5/04**
**U.S. Cl. 343—7 VM** **13 Claims**




1. A Doppler radar system for an anti-collision system of a vehicle, comprising:

first means for transmitting an electromagnetic wave in a direction of movement of said vehicle and for receiving a corresponding echo wave reflected from a target at first and second points spaced from each other to produce first and second Doppler signals in accordance with said reflected echo wave, said first and second points being positioned respectively on port and starboard sides of said vehicle, said first Doppler signal having a frequency proportional to the relative velocity between said target and said first point, said second Doppler signal having a frequency proportional to the relative velocity between said target and said second point;

second means responsive to said first means for producing a first signal indicative of a difference in phase between said first and second Doppler signals, the magnitude of said first signal increasing when the frequency increase rate of said second Doppler signal is greater than that of said first Doppler signal and decreasing when the frequency increase rate of said second Doppler signal is less than that of said first Doppler signal;

third means responsive to said second means for producing a first pulse signal each time the magnitude of said first signal increases and a second pulse signal each time the magnitude of said first signal decreases, said first and second pulse signals being produced separately;

fourth means for permitting respectively the transmission of said first and second pulse signals for a predetermined period of time;

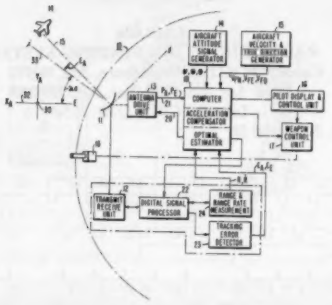
fifth means for up counting said first pulse signals and for down counting said second pulse signals; and

sixth means for producing an alarm signal in accordance with the number of pulses stored in said fifth means.

## 4,148,029
## SYSTEM FOR ESTIMATING ACCELERATION OF MANEUVERING TARGETS

Elmen C. Quesinberry, Severna Park, Md., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Oct. 13, 1976, Ser. No. 731,872
Int. Cl.[2] G01S 7/44
U.S. Cl. 343—9 10 Claims




1. A radar system for tracking a moving target, comprising:
(a) antenna means for sensing radar pulses reflected from the moving target;
(b) means responsive to the reflected pulses to generate a signal representative of the measured target range and a signal representative of the measured angle of error between the antenna line-of-sight and the target;
(c) means to generate estimation gain factor signals to compensate for external and internal radar system errors, said gain factor signals being derived from signals representative of errors in measuring target range, target velocity, and target acceleration;
(d) estimating means governed by the generated measured signals and the generated gain factor signals to generate repetitive signals representative of estimated target range, estimated rate of change of target range, and estimated target acceleration, said target acceleration estimation signal being generated in accordance with the value of a selected number of previously generated estimated acceleration signals;
(e) means to decrement each of the selected number of previously generated estimated acceleration signals a proportional amount in calculating the value of the present estimated acceleration signal; and
(f) compensating means to increase the value of the estimated target acceleration signal to compensate for the attenuation of the previously decremented acceleration estimation signals in accordance with a signal representative of the selected number of previously generated estimation signals and the generated gain factor signals representative of target velocity and acceleration, whereby the increased acceleration signal represents a more accurate representation of a severely maneuvering target.

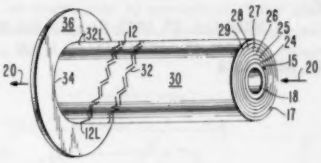
---

## 4,148,030
## HELICAL ANTENNAS

Peter Foldes, Wayne, Pa., assignor to RCA Corporation, New York, N.Y.

Filed Jun. 13, 1977, Ser. No. 806,283
Int. Cl.[2] H01Q 1/36
U.S. Cl. 343—895 3 Claims

1. An antenna comprising:
a pliable, electrically insulating substrate in the form of a sheet;
a first group of coupled metal resonating elements deposited upon said sheet to define a first spiral, said elements resonating at frequencies within a first pass band;
a second group of coupled metal resonating elements fixedly disposed upon said sheet to define a second spiral, said elements resonating at frequencies within a second pass band; and
a cylindrical insulator having one end that is adapted for



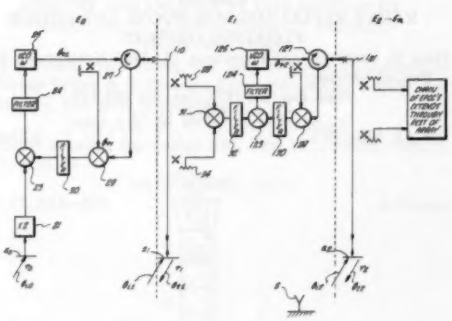

connection to a surface of an electrically conductive ground plate, said sheet being wound on said cylindrical insulator to cause said first and second groups of resonating elements to define first and second helixes, respectively.

---

## 4,148,031
## PHASE CONJUGATION METHOD AND APPARATUS FOR AN ACTIVE RETRODIRECTIVE ANTENNA ARRAY

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of; Robert C. Tausworthe, Pasadena, and Ralph C. Chernoff, Los Angeles, both of Calif.

Filed Mar. 16, 1977, Ser. No. 777,983
Int. Cl.[2] H04B 7/00
U.S. Cl. 343—100 TD 24 Claims



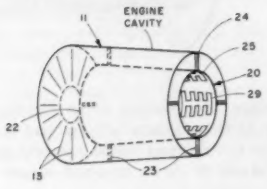
1. In an active retrodirective antenna array for directing a transmitted beam in the direction of an incident pilot signal, the combination comprising:
as least first and second antenna element means;
a first transmission line means exhibiting transmission line delay interconnecting said first and second antenna element means;
said first antenna element means including means receiving a transmitted signal from said second antenna element means across said transmission line means and operative on said transmitted signal and the incident pilot signal at said first antenna element means for generating a phase reference and the phase conjugate of the pilot signal inputted to said second antenna element means plus a transmission line delay.

**4,148,032**

## METHOD AND MEANS FOR DEFOCUSING ENGINE CAVITY REFLECTED ENERGY

**John D. Kelly; Wayne S. Hammond, and Gordon A. Taylor, all of Seattle, Wash., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Oct. 27, 1977, Ser. No. 846,091**
**Int. Cl.[2] H01Q** *15/14, 17/00*
**U.S. Cl. 343—18 A** **6 Claims**




1. A device for substantially dispersing the radar wave and other electromagnetic energy entering aircraft engine and other reflective cavities comprising:

an areal arrangement of a plurality of electromagnetic energy attenuating means disposed in each cavity; and

metal brackets supporting said attenuating means in said cavity,

said attenuating means disposed adjacent to the interior walls and the entrance of said cavity and including a metal cylinder having openings therein configured to selectively dislocate reflective paths of said reflected electromagnetic energy,

said attenuating means interacting with the electromagnetic energy to be dispersed so as to cause electromagnetic energy reflected within said cavity to be defocused and scattered over a broad range of angles at the cavity entrance.

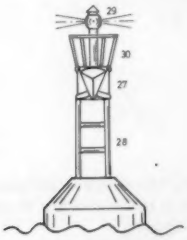
---

**4,148,033**

## RADAR REFLECTOR FOR BUOYS AND OTHER FLOATING OBJECTS

**Hans E. Speckter, Am Heyerberg 11, 5400 Koblenz 33, Fed. Rep. of Germany**

**Filed Jun. 20, 1977, Ser. No. 808,147**
**Int. Cl.[2] H01Q** *15/18*
**U.S. Cl. 343—18 C** **2 Claims**




1. A radar reflector of the kind referred to comprising six identical corner reflectors circumferentially evenly arranged about the main reflector axis, said corner reflectors being made of three plates each perpendicularly joined to one another, with the axes of symmetry of said corner reflectors being equally spaced at 60° intervals in the azimuthal plane, assuming a vertical orientation of said main reflector axis, and forming angles of approximately 90° with main reflector axis, the apertures of said corner reflectors being outwardly directed and disposed in inverted relation to one another when advancing in azimuthal direction, two of said plates of each corner reflector being enlarged up to the intersection lines with the plates of adjacent corner reflectors and one of said plates being enlarged approximately up to the intersection line with an assumed cylindrical surface circumscribing the total reflector assembly, where said cylindrical surface passes through intersection points generated by the inner and outer intersection lines of said plates.

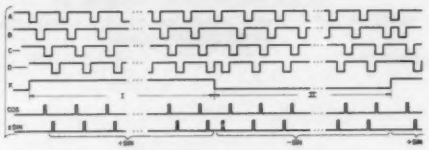
---

**4,148,034**

## RADIO DIRECTION FINDING SYSTEM

**John R. Cooney, R.F.D. 3, Waldoboro, Me. 04572**

**Filed Apr. 21, 1977, Ser. No. 789,368**
**Int. Cl.[2] G01S** *1/40, 3/54*
**U.S. Cl. 343—106 D** **5 Claims**



1. A radio direction finding system comprising:

A. an antenna system including a transmitting antenna and associated radio transmitter at a first reference location and a receiving antenna and associated radio receiver at a second location, one of said antennas being characterized by an omni-directional antenna pattern and the other being characterized by a directional antenna pattern,

B. means to rotate said pattern of said directional antenna, wherein the direction of rotation is periodically reversed at a rate relatively low compared to the rate of rotation, said rotation means including an associated means to generate a direction signal representative of the direction of rotation of said pattern and a phase reference signal, said phase reference signal being periodic at a multiple of the rate of rotation of said pattern and bearing a fixed time relation thereto,

C. demodulator means coupled to said receiver, said demodulator being responsive to signals received from said transmitter, and to said direction of rotation signal and said phase reference signal, to generate a first demodulated signal representative of the modulation on said received signal due to said rotation of said pattern when said pattern rotates in a first direction, and to generate a second demodulated signal representative of the modulation on said received signal due to said rotation of said pattern when said pattern rotates in the direction opposite to said first direction, and

D. means to combine said first and second demodulated signal and generate a bearing signal, said bearing signal being representative of the bearing of said first location relative to said second location.

---

**4,148,035**

## SUBWAVELENGTH MONOPULSE ANTENNA

**Peter Foldes, Wayne, Pa., assignor to RCA Corp., New York, N.Y.**

**Filed Dec. 14, 1977, Ser. No. 860,870**
**Int. Cl.[2] H01Q** *13/02*
**U.S. Cl. 343—754** **10 Claims**

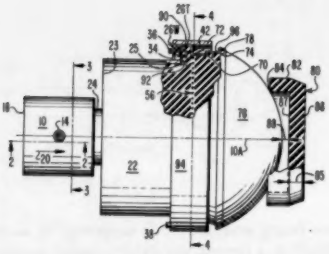
1. A monopulse radiator, comprising:

a cylindrical multimode waveguide having one end adjacent a circular launching aperture region;

sum channel means connected to the other end of said multimode waveguide for propagating therethrough in a $TE_{11}$ mode a sum mode radio frequency wave in response to a sum channel excitation signal;

a difference channel waveguide having a cavity with an

approximately rectangular cross-section that is contiguous with the cavity of said multimode waveguide and where an application of a difference channel excitation signal causes a difference mode wave to propagate therefrom through said launching aperture to combine with said sum mode wave to form a forward wave, one portion of said difference mode wave being propagated in a $TM_{01}$ mode; and



coupling means connected to said multimode waveguide for providing a substantially matched impedance coupling of said forward wave to free space, whereby said forward wave forms a radiated beam, said beam being deflected in a selected plane in response to said difference channel excitation being in phase and out of phase with said sum channel excitation.

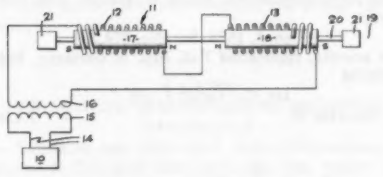
---

**4,148,036**

## MAGNETIC QUADRAPOLE ANTENNA

**Wendell S. Miller, 1341 Comstock Ave., Los Angeles, Calif. 90024**

**Filed Jul. 6, 1962, Ser. No. 207,992**
**Int. Cl.[2] H01Q *7/08*; H04B *5/00***
**U.S. Cl. 343—788** **13 Claims**



1. The combination comprising a pair of magnetic dipole antennae of substantially equal radiation strength in proximate but offset relation and oriented with their axes extending in a common direction, and an oscillating current source operatively connected to both of said antennae to drive them simultaneously but in opposed phase relationship, whereby the dipole moments of said antennae substantially cancel one another so that the antennae function together to produce a magnetic quadrapole radiation substantially free of any dipole moment.

---

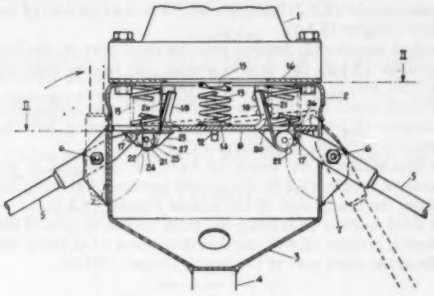
**4,148,037**

## RETRACTING MECHANISM FOR ANTENNA GROUND PLANE RADIALS

**David P. Britten, Cosham, England, assignor to The Marconi Company Limited, Chelmsford, England**

**Filed Jun. 1, 1977, Ser. No. 802,440**
**Claims priority, application United Kingdom, Jun. 2, 1976, 22823**
**Int. Cl.[2] H01Q *1/08, 9/38***
**U.S. Cl. 343—846** **6 Claims**

1. An aerial comprising a longitudinal conductor, a plurality of conductor arms extendable laterally from one end of said longitudinal conductor to provide a ground plane, a retracting mechanism supporting said arms in relation to said longitudinal conductor, said mechanism comprising a pivot in respect of each of said arms, the axis of each pivot being transverse to the longitudinal conductor, resilient locating means for the inner end of each arm, said resilient locating means comprising a first resiliently mounted member in respect of each arm, said member providing an obstruction to movement of the associated arm in one direction, said obstruction being displaceable by sufficient force, and a second resiliently mounted member for



resisting movement of the associated arm in the opposite direction for the total extent of such movement, said resilient locating means determining a stable position of the associated arm, from which stable position the arm can escape by a sufficient movement in said one direction along the axis of said longitudinal conductor but from which stable position the arm cannot escape by movement in said opposite direction, the mechanism permitting the arms to retract temporarily for insertion of the aerial through a restricted aperture, and to retract permanently on withdrawal of the aerial from the aperture.

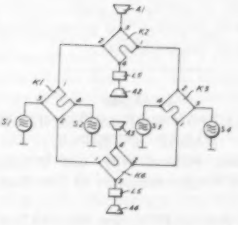
---

**4,148,038**

## CIRCUIT ARRANGEMENT FOR MUTUALLY DECOUPLED CONNECTING OF PLURAL TRANSMITTERS

**Dirk J. Braak, Heroldsberg, Fed. Rep. of Germany, assignor to Tekade Felten & Guilleaume Fernmeldeanlagen GmbH, Nuremberg, Fed. Rep. of Germany**

**Filed Aug. 29, 1977, Ser. No. 828,627**
**Claims priority, application Fed. Rep. of Germany, Sep. 1, 1976, 2639348**
**Int. Cl.[2] H01Q *13/00***
**U.S. Cl. 343—858** **8 Claims**



1. A non-directional transmitting system simultaneously and non-directionally transmitting four signals having different but closely spaced frequencies, comprising, in combination

a first, second, third and fourth transmitting antenna (A1 to A4), the four antennas being identical directional antennas, the four antennas being oriented so as to face in respective directions each spaced from the next by 90°,

a first, second, third and fourth signal source (S1 to S4), each producing a respective one of said four signals,

a first, second, third and fourth 3-dB coupler (K1 to K4), each 3-dB coupler being four-port and having a first (1), second (2), third (3) and fourth (4) port,

the second port of the first couplter (K1-2) being connected to the first port of the fourth coupler (K4-1), the second port of the fourth coupler (K4-2) being connected to the first port of the third coupler (K3-1), the second port of the third coupler (K3-2) being connected to the first port of the second coupler (K2-1), the second port of the second coupler (K2-2) being connected to the first port of the first coupler (K1-1),

the first source (S1) feeding into the third port of the first coupler (K1-3), the second source (S2) feeding into the fourth port of the first coupler (K1-4),

the third source (S3) feeding into the fourth port of the third coupler (K3-4), the fourth source (S4) feeding into the third port of the third coupler (K3-3),

the first antenna (A1) being fed from the third port of the second coupler (K2-3), the second antenna (A2) being fed from the fourth port of the second coupler (K2-4),

the third antenna (A3) being fed from the fourth port of the fourth coupler (K4-4), the fourth antenna (A4) being fed from the third port of the fourth coupler (K4-3).

---

**4,148,039**

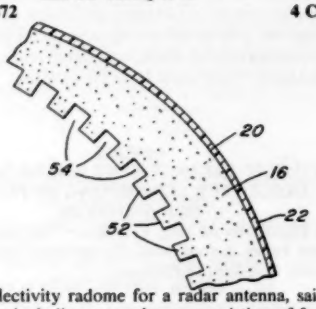
## LOW REFLECTIVITY RADOME

**Clarence D. Lunden, Federal Way, Wash., assignor to The Boeing Company, Seattle, Wash.**

**Division of Ser. No. 813,065, Jul. 5, 1977. This application Jul. 17, 1978, Ser. No. 925,089**

**Int. Cl.[2] H01Q *1/42***

**U.S. Cl. 343—872** **4 Claims**




1. A low reflectivity radome for a radar antenna, said radome essentially including an enclosure consisting of foamed plastic material, said enclosure defining a smooth air-side facing surface and an oppositely-facing inner surface, said inner surface being defined by parallel projecting ribs integral with said enclosure for phase matching the interface of said inner surface, and a layer of conductive paint covering the air-side facing surface of said enclosure for phase matching the interface at the air-side of the enclosure.

---

**4,148,040**

## HIGH RESOLUTION SIDE-LOOKING AIRBORNE RADAR ANTENNA

**Clarence D. Lunden, Federal Way, and Walter E. Buehler, Issaquah, both of Wash., assignors to The Boeing Company, Seattle, Wash.**

**Filed Nov. 3, 1976, Ser. No. 738,703**

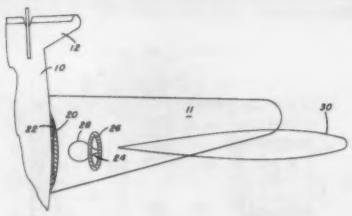
**Int. Cl.[2] H01Q *1/28, 19/06, 19/12***

**U.S. Cl. 343—708** **11 Claims**

1. A high resolution side-looking airborne radar antenna apparatus on an aircraft, said apparatus comprising, in combination,

a metallic reflector attached to the fuselage of the aircraft facing outwardly above an airfoil thereof,

a retrolental dielectric slim lens mounted superimposed onto said reflector to face outwardly above an airfoil of the aircraft, said lens having a varying dielectric constant across the face thereof to collimate incidental electromagnetic wave energy through a double traversal of the lens and reflection by said reflector for producing a very sharp azimuth radar beam,




a feed horn facing said lens while supported by an airfoil of the aircraft at a remote outwardly-spaced location from said lens for utilizing the airfoil as a radio-frequency shield, and

housing means on the top surface of the wing of the aircraft for said feed horn.

---

**4,148,041**

## METHOD AND APPARATUS FOR PURGING AIR FROM JET INK WRITING SYSTEMS

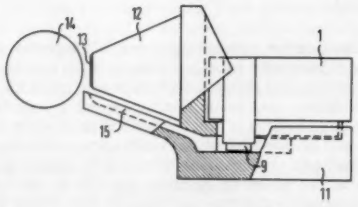
**Günter Rosenstock, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany**

**Filed Feb. 1, 1978, Ser. No. 874,204**

**Claims priority, application Fed. Rep. of Germany, Feb. 4, 1977, 2704704**

**Int. Cl.[2] G01D *15/16***

**U.S. Cl. 346—140 R** **7 Claims**



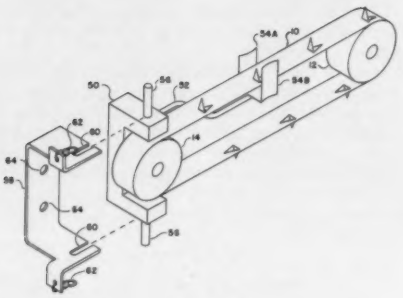

1. A device for purging air from print heads of ink printing equipment of the type in which the print head assembly is provided with a configured receipt area for receipt of exchangeable printing ink supply chambers, the improvement of a flushing liquid tank assembly having a liquid chamber interior thereof, the liquid chamber filled with a flushing liquid, the flushing liquid being a liquid which does not mix with the printing ink utilized in the printing equipment and being a liquid which will wet the material of the print head, the flushing liquid tank being dimensioned to be received in the receipt area in communication with ink supply channels interior of the print head, the flushing liquid tank being provided with means for temporarily increasing pressure on the flushing liquid contained within the flushing liquid tank.

4,148,042

## ELECTROGRAPHIC COPIER WITH ONE-PIECE BELT AND STYLI

Jon C. Mutton, Portland, and Peter J. Unger, Beaverton, both of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Filed Nov. 11, 1977, Ser. No. 850,529
Int. Cl.[2] G03G *15/02, 15/00*
U.S. Cl. 346—155 5 Claims



1. An electrographic copier, comprising:

endless belt means carried by rotatable members, said endless belt means including styli in the form of projecting pins and being formed from selectively spaced, cut, and bent out, pointed segments thereof;

an electrode disposed adjacent at least a portion of said endless belt means, said electrode including means responsive to a control signal for causing an electric field to be effected between said electrode and said styli; and

means for developing an electrostatic charge pattern corresponding to said electric field to produce a copy, said means being adapted to be moved orthogonal to an axis of rotation of said rotatable members and also being adapted to make contact with said electrode and at least one of said styli.

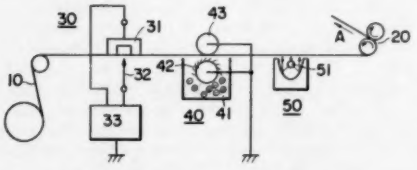
---

4,148,043

## TWO-COLOR ELECTROSTATIC PRINTING APPARATUS

Mineo Yamauchi, and Akira Sumi, both of Musashino, Japan, assignors to Yokogawa Electric Works, Ltd., Tokyo, Japan

Filed Mar. 28, 1977, Ser. No. 782,095
Claims priority, application Japan, Mar. 31, 1976, 51-35640
Int. Cl.[2] G03G *15/02*
U.S. Cl. 346—157 14 Claims



1. A two-color electrostatic printing apparatus comprising a charging part with a discharge electrode and an opposite electrode on opposite sides of a moving dielectric for applying positive and negative electrostatic latent images having opposite electric polarities, and a developing part for applying first and second toners having opposite electric polarities to respective ones of said positive and negative electrostatic latent images, wherein said charging part of said printing apparatus comprises

a discharge electrode including electrode pins arrayed in a row in the direction orthogonal with the movement of said dielectric, and

electric circuit means responsive to at least one signal for selectively actuating said electrode pins according to predetermined positive and negative electrostatic image patterns and responsive to a color designation signal for sequentially inverting the polarity of voltage differences between said discharge electrode and said opposite electrode to provide latent image patterns in rows of alternating polarities.

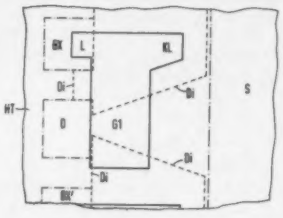
---

4,148,044

## N-CHANNEL MEMORY FIELD EFFECT TRANSISTOR

Bernward Roessler, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Sep. 19, 1977, Ser. No. 834,425
Claims priority, application Fed. Rep. of Germany, Sep. 29, 1976, 2643987
Int. Cl.[2] H01L *29/78*
U.S. Cl. 357—23 7 Claims

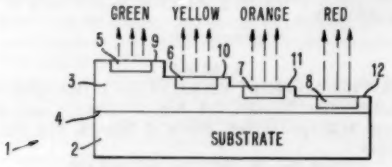


1. An n-channel memory FET comprising a p-type semiconductor substrate having spaced drain and source regions of $n^+$ conductivity type in one surface of said substrate, a channel region in said substrate between said source and drain regions, a third $n^+$ region in said substrate spaced from said source, drain and channel regions, an insulating layer covering said substrate, a floating memory gate above said channel region between said source and drain being conductively connected to a single conductive tongue, said memory gate and said tongue being in said insulating layer completely surrounded by the insulating material of said insulating layer, said memory gate being located above said channel region, said single conductive tongue extending to a position above said third $n^+$ region, said tongue being insulated from said third $n^+$ region and from said source and said drain, a control gate on said memory gate separated therefrom by said insulating material, means for applying different electric potentials to said source and said drain, transfer of charges to said memory gate being by strongly accelerating charges in said channel region, namely by heating up said charges by a strong electric field acting in the source-drain direction, said charges thereby overcoming the energy threshold to the conductivity band due to a high positive bias on said control gate and on said drain with respect to said source, electrons are transferred to said memory gate by being accelerated in said channel region by being heated up by an electric field acting in a source-drain direction sufficiently to overcome the energy threshold to the conductivity band of said insulating layer, the charging of said memory gate occurring by the resulting channel injection, the resulting charge in said memory gate inhibiting the source-drain current, a control gate terminal for connection with the control voltage which when it is an erase voltage causes said control gate to act capacitively on said memory gate to cause said memory gate to be discharged through said conductive tongue to said third $n^+$ region, the thickness of the insulation between said channel region and said memory gate being at least 100 A.

## 4,148,045
## MULTICOLOR LIGHT EMITTING DIODE ARRAY

Frank F. Fang, and Kwang K. Shih, both of Yorktown Heights, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Sep. 21, 1977, Ser. No. 835,097
Int. Cl.[2] H01L *33/00*
U.S. Cl. 357—17 9 Claims




1. An electrical to electrooptical energy conversion device comprising a monocrystalline semiconductor body of the type $AB_{1-x}C_x$,

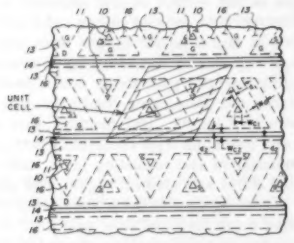
said body having at least one major surface and having the variable x evenly varying along a vertical dimension with respect to said major surface throughout the full range from 0 to 1, and

at least one p-n junction formed in said body at an exposed position corresponding to a particular value of x within said evenly varying full range.

## 4,148,046
## SEMICONDUCTOR APPARATUS

Thomas E. Hendrickson, Wayzata, and Jack S. T. Huang, Plymouth, both of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Jan. 16, 1978, Ser. No. 869,977
Int. Cl.[2] H01L *29/72*
U.S. Cl. 357—23 58 Claims




1. A semiconductor device containing therein a first field-effect transistor device, having a source, drain, gate and substrate, and being capable of withstanding a relatively high voltage between said drain and said substrate and between said drain and said source when in an "off" condition, said field-effect transistor device comprising:

a semiconductor material body of a first conductivity type, in at least some parts of a first portion thereof serving as said substrate, and having a major surface where said first body portion intersects said major surface to form a first major surface portion, said first body portion having a first dopant distribution therein leading to said first conductivity type where said first dopant has a maximum concentration of less than $5 \times 10^{15}$ atoms per cubic centimeter except in a threshold voltage adjust surface region adjacent to said first major surface portion wherein a selected first dopant threshold adjust surface region distribution is provided;

a first drain region of a second conductivity type located in said first body portion and intersecting said first major surface portion, said first drain region having a second dopant net distribution therein for said second dopant in excess of said first dopant in said threshold voltage adjust surface region leading to said second conductivity type which is so distributed by having passed a maximum of $1 \times 10^{13}$ atoms of said second dopant per unit area through said intersection of said first drain region and said first major surface portion in excess of those first dopant atoms present immediately adjacent to this said intersection;

a first source region of said second conductivity type located in said first body portion and intersecting said first major surface portion, said first source region being spaced apart from said first drain region in said first major surface portion;

a first gate conductive means separated from said first major surface portion by a first insulating layer of a first thickness and located across said first insulating layer from that space occurring between said first drain and first source regions in said first major surface portion;

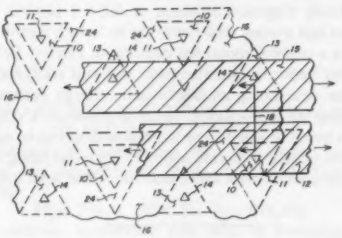
a drain region interconnection means in electrical contact with said first drain region; and

a source region interconnection means in electrical contact with said first source region.

## 4,148,047
## SEMICONDUCTOR APPARATUS

Thomas E. Hendrickson, Wayzata, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Jan. 16, 1978, Ser. No. 869,981
Int. Cl.[2] H01L *29/72*
U.S. Cl. 357—23 65 Claims



1. A semiconductor device containing therein a first field-effect transistor device, having a source, drain and gate, and exhibiting a relatively low resistance between said source and drain when in an "on" condition, said first field-effect transistor device comprising:

a semiconductor material body of a first conductivity type, in at least some portions thereof, and having a first major surface;

a first plurality of regions of a second conductivity type each located in said semiconductor material body in such a manner as to intersect said first major surface in a first plurality of triangular surface portions completely separated in said first major surface and at least partly so separated by a first surface mesh formed by other portions of said semiconductor material body, each said triangular surface portion in said first plurality thereof having each of those edges serving as boundaries thereof, including an outer edge, substantially parallel to one edge in every other triangular surface portion in said first plurality of triangular surface portions, said first plurality of triangular surface portions being arranged along a first direction in said first major surface such that each said outer edge in each said triangular surface portion in said first plurality thereof is substantially parallel to said first direction;

a second plurality of regions of said second conductivity type located in said semiconductor material body in such a manner as to intersect said first major surface in a second plurality of triangular surface portions completely separated in said first major surface and at least partly so

separated by a second surface mesh formed by other portions of said semiconductor material body, each said triangular surface portion in said second plurality thereof having each of those edges serving as boundaries thereof, including an outer edge, substantially parallel to one edge in every other triangular surface portion in said second plurality of triangular surface portions, said second plurality of triangular surface portions being arranged along said first direction such that each said outer edge in each said triangular surface portion in said second plurality thereof is substantially parallel to said first direction, said first and second pluralities of triangular surface portions being adjacent but spaced apart from one another in said first major surface by portions of said first and second surface meshes with an outer edge of every other triangular surface portion in said first plurality thereof being located just across said spacing from an outer edge of a triangular surface portion in said second plurality thereof;

a gate region located adjacent to said first major surface;

a first interconnection means electrically interconnecting selected said triangular surface portions in both said first and second pluralities of regions; and

a second interconnection means being in electrical contact with said first major surface.

---

**4,148,048**

## SOLID-STATE IMAGING DEVICE

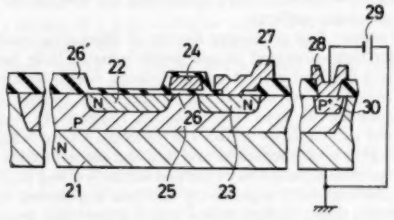
**Iwao Takemoto, Kodaira; Norio Koike, Tokyo, and Masaharu Kubo, Hachioji, all of Japan, assignors to Hitachi, Ltd., Japan**

**Filed Jan. 23, 1978, Ser. No. 871,252**

**Claims priority, application Japan, Jan. 24, 1977, 52/5953; Apr. 1, 1977, 52/36163**

**Int. Cl.[2] H01L *27/14***

**U.S. Cl. 357—30** **22 Claims**




1. A solid-state imaging device comprising

a semiconductor substrate of a first conductivity type having a first surface region of a second conductivity type opposite to said first conductivity type,

means for biasing backwardly a pn junction which is constituted by said substrate and said first surface region, and

a plurality of picture elements disposed in said first surface region, each of said picture element being comprised of:

(i) a picture element region disposed in said first surface region and provided so as to be isolated from other picture elements;

(ii) a first region of said first conductivity type disposed in said picture element region and constituting a pn-junction diode together with said first surface region; and

(iii) detective means for detecting signal charges stored in a junction capacitance of said pn-junction diode.

**4,148,049**

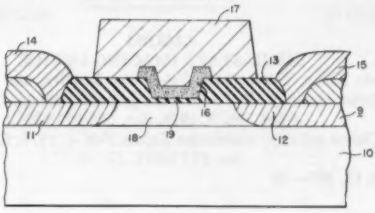
## RADIATION HARDENED DRAIN-SOURCE PROTECTED MNOS TRANSISTOR

**James R. Cricchi, Catonsville; Franklyn C. Blaha, and Michael D. Fitzpatrick, both of Glen Burnie, all of Md., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Continuation of Ser. No. 563,423, Mar. 28, 1975, abandoned. This application Feb. 4, 1977, Ser. No. 765,484**

**Int. Cl.[2] H01L *29/78***

**U.S. Cl. 357—23** **5 Claims**




1. A transistor comprising, in combination:

a. a semiconductor substrate of a first conductivity type having first and second separated regions of a second conductivity type therein said first and second regions respectively forming drain and source regions having a channel region disposed therebetween;

b. a first insulating layer selectively overlying said semiconductor substrate, said first insulating layer including thinner and thicker portions, said thinner portion overlying a central portion of said channel region, said thicker portion overlying at least the remainder of said channel region;

c. a second insulating layer overlying at least said thinner portion of said first insulating layer;

d. an electrically conductive layer electrically contacting said thick portions of said first insulating layer and overlying said thinner portions of said second insulating layer; and

e. means for forming electrical connections to said electrically conducting layer and said first and second regions of a second conductivity type.

---

**4,148,050**

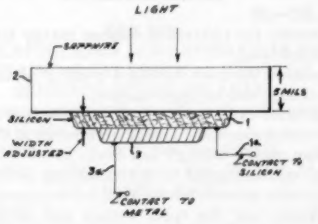
## RADIATION DOSE RATE HARDENED LIGHT DETECTOR

**Roe J. Maier, Jr., Bosque Farms, N. Mex., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed Jan. 3, 1978, Ser. No. 866,432**

**Int. Cl.[2] H01L *27/14***

**U.S. Cl. 357—30** **4 Claims**




1. A radiation dose rate hardened detector of light being comprised of a sapphire substrate of a preselected thickness and having first and second sides, a silicon island with first and second sides, said first side of said silicon island positioned on said first side of said sapphire substrate, said silicon island

having the thickness thereof adjusted to produce interference resonance absorption at a predetermined wavelength, a metal electrode positioned on said second side of said silicon island, said metal electrode being composed of a metal that forms a Schottky diode on said silicon island, a first electrical contact connected to said metal electrode, and a second electrical contact connected to said silicon island, said light entering said detector from said second side of said sapphire substrate and reflecting back and forth in said silicon island causing said absorption to occur in a small region.

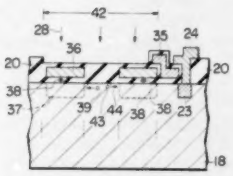
---

**4,148,051**

## SOLID-STATE IMAGING DEVICE

**Norio Koike, Tokyo; Iwao Takemoto, Kodaira, and Masaharu Kubo, Hachioji all of Japan, assignors to Hitachi, Ltd., Japan**

**Filed Feb. 3, 1978, Ser. No. 874,939**
**Claims priority, application Japan, Feb. 4, 1977, 52/10712**
**Int. Cl.[2] H01L *27/14***
**U.S. Cl. 357—30** **14 Claims**




**8**. A solid-state imaging device comprising a semiconductor substrate of a first conductivity type having a major surface and a plurality of picture elements disposed in a surface portion of said semiconductor substrate, said picture element being comprised of;

(i) a transparent insulating film which is disposed on said major surface so as to cover a photosensitive region in said picture element;

(ii) a transparent gate electrode which is disposed on said transparent insulating film, and is supplied with a predetermined voltage;

(iii) a window hollowing said transparent gate electrode therethrough; and

(iv) detective means for detecting signal charges stored in said photosensitive region.

---

**4,148,052**

## RADIANT ENERGY SENSOR

**Harvey C. Nathanson, Pittsburgh, and Richard N. Thomas, Murrysville, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Oct. 12, 1977, Ser. No. 841,408**
**Int. Cl.[2] H01L *27/14***
**U.S. Cl. 357—30** **15 Claims**

**1**. A sensor for converting radiant energy into electrical signals comprising:

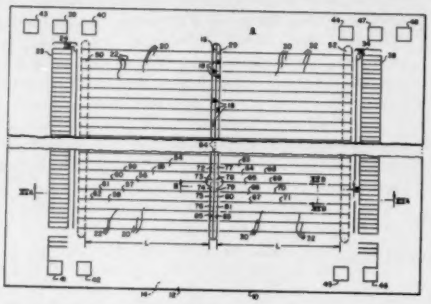
a crystalline substrate having a predetermined crystalline orientation and an upper surface,

said substrate including a plurality of elongated detectors for generating electronic charge in response to the passing of radiant energy through said detector,

one of said elongated detectors having portions thereof physically separated from adjacent detectors by grooves extending into the upper surface and having sidewalls bounded by selected crystalline planes of said substrate for electrically and optically isolating said detector and adjacent detectors from each other, and

wherein said crystalline substrate has a first reflecting surface for reflecting incident radiant energy into a plurality of said elongated detectors.

**13**. The sensor of claim **1** wherein said crystalline substrate has a lower surface and wherein a plurality of said elongated detectors have electrodes formed on said upper and lower



surface of said substrate in the area above and below each detector.

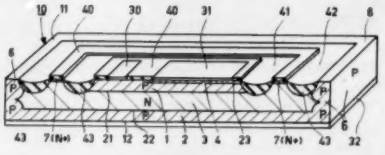
---

**4,148,053**

## THYRISTOR CONTAINING CHANNEL STOPPER

**Cornelis A. Bosselaar, Nijmegen, Netherlands, and Alan Foster, Stockport, United Kingdom, assignors to U.S. Philips Corporation, New York, N.Y.**

**Continuation of Ser. No. 662,427, Mar. 1, 1976, abandoned. This application Dec. 12, 1977, Ser. No. 859,688**
**Claims priority, application United Kingdom, Mar. 26, 1975, 12648/75**
**Int. Cl.[2] H01L *29/74***
**U.S. Cl. 357—38** **6 Claims**




**1**. A thyristor comprising:

(a) a semiconductor body comprising first and second opposite major surfaces,

(b) at least four successive regions of alternating conductivity types arranged in said semiconductor body between said first and second major surfaces, which four regions comprise first and second surface-layer regions of one conductivity type which adjoin, respectively, said first and second major surfaces of the body, a third inner-layer region which separates said first and second regions, is of opposite conductivity type and forms first and second p,n junctions with respectively said first and second regions, and a fourth surface region which is provided in said first region adjacent said first major surface, which fourth region is of said opposite conductivity type and forms a third p,n junction with said first region,

(c) a first annular moat located in said first major surface of said body and containing passivating dielectric material therein, said first annular moat laterally bounding said first region and said first p,n junction terminating at said first moat and being passivated by said dielectric material in said first moat,

(d) a further region of said one conductivity type laterally bounding said third region and merging with said second region to extend said second p,n junction toward said first major surface,

(e) a second annular moat located in said first major surface of said body, said second moat having an outer periphery spaced from the periphery of the body, the second annular moat extending around said first annular moat and containing passivating dielectric material therein, said second

p,n junction terminating at the dielectric material at the outer periphery of said second moat and being passivated by said dielectric material in said second moat,

(f) a highly-doped surface region of said opposite conductivity type located at said first major surface between said first and second moats to form a channel stopper located between and spaced from the terminations of said first and second p,n junctions at, respectively, said first and second moats,

(g) a control electrode connected to said first region and located at said first surface,

(h) a first electrode connected to said fourth region and located at said first surface, and

(i) a second electrode connected to said second region and located at said second surface.

---

**4,148,054**

## METHOD OF MANUFACTURING A SEMICONDUCTOR DEVICE AND DEVICE MANUFACTURED BY USING THE METHOD

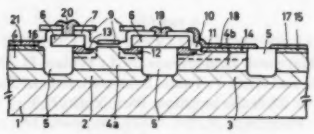
**Cornelis M. Hart, and Jan Lohstroh, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Apr. 7, 1978, Ser. No. 894,241**

**Claims priority, application Netherlands, Apr. 12, 1977, 7703941**

**Int. Cl.[2] H01L** *21/225, 21/26;* **H01L** *27/04*

**U.S. Cl. 357—44** **12 Claims**



1. A method of manufacturing a semiconductor device in which a surface of a semiconductor region is provided with a pattern of electrically insulating material surrounding an island-shaped part of the region, and a doped silicon layer is provided on the surface, on which silicon layer a layer of another material is provided from which an etching mask is formed, after which an etching process is carried out in which the parts of the silicon layer not underlying the etching mask are removed and a free edge part of the etching mask is obtained by underetching, and the edge of the silicon layer and the surface underlying the said edge part are then provided with an oxide layer by thermal oxidation, during which oxidation a first surface zone is formed by diffusion from the doped silicon layer, a second surface zone being formed by the introduction of a dopant in a part of the semiconductor surface not underlying the etching mask and bounded substantially by the projection of the edge of the etching mask, characterized in that the doped silicon layer is provided partly on the island-shaped part of the semiconductor region and partly on the insulating pattern, that, after obtaining the free edge part and prior to the thermal oxidation, a layer masking against oxidation and having a thickness smaller than the said silicon layer is deposited on the whole surface with the exception of the surface region underlying the free edge part, and that, after the thermal oxidation, the layer masking against oxidation is removed at least from a surface part adjoining the oxidized surface region, the first and the second surface zones being provided both so as to adjoin the insulating pattern.

**4,148,055**

## INTEGRATED CIRCUIT HAVING COMPLEMENTARY BIPOLAR TRANSISTORS

**Wolfgang F. J. Edlinger, Son, Netherlands; Michel De Brebisson, Caen, France; Jean-Pierre H. Biet, Bieville-Beuville, France, and Jean-Michel Decrouen, Argences, France, assignors to U.S. Philips Corporation, New York, N.Y.**

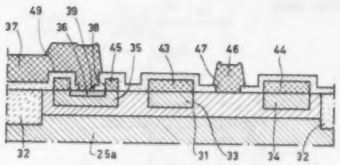
**Continuation of Ser. No. 753,272, Dec. 22, 1976, abandoned.**

**This application May 19, 1978, Ser. No. 907,819**

**Claims priority, application France, Dec. 29, 1975, 75 39963**

**Int. Cl.[2] H01L** *27/02*

**U.S. Cl. 357—44** **17 Claims**



1. An integrated circuit comprising

a semiconductor substrate region of a first conductivity type;

a local region of semiconductor material of a second conductivity type disposed on said substrate region, having a first main surface adjoining said substrate region, and a second main surface opposite said first surface;

first and second regions of insulating material, said first region at least partially adjoining said second main surface of said local region, said second region of insulating material at least partially laterally bounding said local region;

a first bipolar transistor having first, second and third vertically arranged successive zones, said second zone forming the base zone of said first transistor and coinciding with said local region, said first zone making rectifying contact with said base zone and comprising at least the portion of said substrate region adjoining said base zone, and said third zone making rectifying contact with said base zone and situated at said second main surface of said local region;

a second bipolar transistor complementary to said first transistor having first, second and third vertically arranged successive zones, said first zone being a collector zone, said second zone being a base zone, and said third zone being an emitter zone; said collector zone of said second transistor coinciding with said local region; and

a semiconductor layer of said first conductivity type extending partially over said second region of insulating material for forming a connection track, and partially over said local semiconductor region, at least a first portion of said semiconductor layer comprising said base zone of said second transistor.

---

**4,148,056**

## GLASS-ENCAPSULATED SEMICONDUCTOR DEVICE CONTAINING CYLINDRICAL STACK OF SEMICONDUCTOR PELLETS

**Akira Matsunaga, and Kensuke Suzuki, both of Hitachi, Japan, assignors to Hitachi, Ltd., Japan**

**Filed Jun. 22, 1977, Ser. No. 809,107**

**Claims priority, application Japan, Jun. 25, 1976, 51-74320**

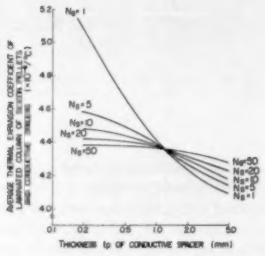
**Int. Cl.[2] H01L** *23/30*

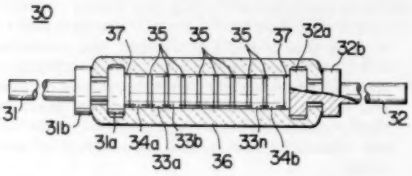
**U.S. Cl. 357—73** **8 Claims**

1. A glass-encapsulated semiconductor device comprising:

(a) a rectifier unit, which includes a pair of electrodes each with an external lead wire attached to an end thereof, a plurality of semiconductor pellets of a prescribed coefficient of thermal expansion $\alpha_S$ and a prescribed thickness $t_S$, each of said pellets having a rectifying pn junction exposed at the periphery, at least one electrically conductive

spacer having a prescribed coefficient of thermal expansion $\alpha_P$, said spacer excluding tungsten, and a plurality of soldering material layers having an influence upon the thermal expansion coefficient of said rectifier unit for mechanically and electrically bonding and connecting said pellets, spacer and said electrodes with each other, each of said soldering layers having a prescribed coefficient of thermal expansion $\alpha_A$ and a prescribed thickness $t_A$, wherein said pellets, said spacer and said soldering material layers are laminated together in the form of a stack with said pair of electrodes that are disposed in contact with the soldering material layers at opposite ends of said rectifier unit;




(b) a protective glass layer for passivating the pn junction of said pellets and for protecting said rectifier unit against mechanical stress and having a prescribed coefficient of thermal expansion within a range between a coefficient of the thermal expansion of said pellets and a coefficient of the thermal expansion of said soldering material layers, said glass layer surrounding and being contiguous to the exposed surface of said stack, and said glass layer extending from the periphery of one of said electrodes to the periphery of the other electrode; and

(c) said at least one conductive spacer having a thickness $t_P$ determined by the expression:

$$t_P \approx \frac{N_P + 1}{N_P} \left( \frac{\dfrac{\alpha_S t_S + \alpha_A t_A}{t_S + t_A} - \alpha_A}{\alpha_P - \dfrac{\alpha_S t_S + \alpha_A t_A}{t_S + t_A}} \right) t_A$$

where the thermal expansion coefficient $\alpha_P$ of said spacer satisfies the inequality:

$$\alpha_P < \frac{\alpha_S t_S + \alpha_A t_A}{t_S + t_A}$$

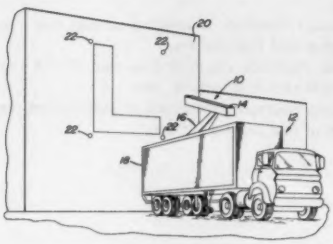
and $N_P$ represents the number of the said conductive spacers.

**4,148,057**

## DIRECT LASER PRINTING AND FORMING APPARATUS

**William L. M. Jesse, Upper Darby, Pa., assignor to Solution Sciences, Inc., Upper Darby, Pa.**

**Filed Oct. 25, 1977, Ser. No. 845,007**
**Int. Cl.[2] H04N 5/76**
**U.S. Cl. 358—4** **24 Claims**




1. Apparatus for printing on a surface, comprising:

means for applying a polymerizable ink to the surface to be printed, said ink polymerizing in response to energy radiation;

a source of a directable beam of energy radiation;

means for controlling the source of radiation in intensity and scanning in response to electrical signal information whereby the energy radiation may polymerized the ink at a plurality of points on the surface to form a printed image; and

means for removing from the surface ink which has not been polymerized.

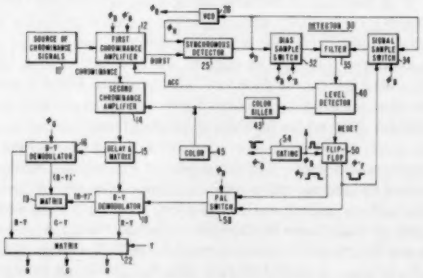
---

**4,148,058**

## PAL SWITCHING CONTROL CIRCUIT

**Leopold A. Harwood, Bridgewater, N.J.; Willem H. Groeneweg, Ottenbach, and Alois V. Tuma, Schlieren, both of Switzerland, assignors to RCA Corporation, New York, N.Y.**

**Filed Sep. 26, 1977, Ser. No. 836,712**
**Int. Cl.[2] H04N 9/50**
**U.S. Cl. 358—24** **8 Claims**




1. In a receiver for processing a color television signal including a luminance component, deflection synchronizing components at respective line and field rates, and chrominance and burst components exhibiting a prescribed mutual timing relationship and alternating in phase on a line by line basis, a chrominance channel for processing said color signal, a plurality of color demodulators for demodulating selected phases of said chrominance component, means for providing line by line switching control of one of said demodulators, and wherein proper operation of said receiver requires that said demodulator be switched in correct timing synchronism with line by line alternation of signals received by said receiver, switching control apparatus comprising:

a source of periodic trigger pulses occurring at said line rate;

timing means coupled to said switching means and responsive to said trigger pulses for providing half line frequency timing signals for determining said line by line switching;

means coupled to said chrominance channel and responsive to said burst component and said timing signals for deriving an identification signal when said demodulator switching occurs with incorrect timing synchronism, said signal deriving means exhibiting a fast response time relative to said line rate; and

means for utilizing said identification signal, when present, as a supplementary trigger input to said timing means for resetting said timing means to provide timing signals corresponding to correct line by line timing synchronism.

---

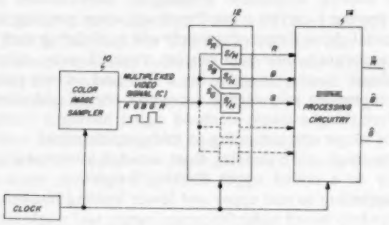
## 4,148,059
## SIGNAL PROCESSING FOR DISCRETE-SAMPLE-TYPE-COLOR-VIDEO SIGNAL

**Peter L. P. Dillon, Pittsford, and Bryce E. Bayer, Greece, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Continuation-in-part of Ser. No. 685,824, May 12, 1976, and a continuation-in-part of Ser. No. 813,377, Jul. 6, 1977. This application Oct. 11, 1977, Ser. No. 840,877**

**Int. Cl.[2] H04N** *5/14*

**U.S. Cl. 358—37** **8 Claims**




1. In combination:

(A) an imaging device of the type adapted to produce discrete sample type signals corresponding to images;

(B) processing means for receiving signals produced by said imaging device for time delaying said signals by a first amount and by a second longer amount; and

(C) signal combining means adapted to receive the undelayed signals which are applied to said processing means and the signals which are delayed by said first and second amounts, the signal combining means being adapted to produce resultant signals representing the difference between the sum of said undelayed signal and the signal which is delayed by said second amount, and the signal which is delayed by said first amount, said resultant signals being enhanced versions of the signals corresponding to said images, said processing means being adapted to provide delays of first and second durations which correspond, respectively, to the duration of one sampling period and to two sampling periods of said imaging device.

---

## 4,148,060
## APPARATUS FOR DISTRIBUTING TELEVISION SIGNAL WITH STEREOPHONIC AUDIO VIA SATELLITE

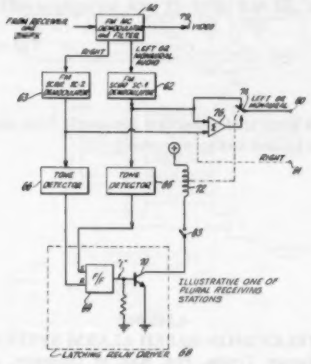
**David E. Hershberg, East Setauket, N.Y., assignor to Satellite Transmission Systems, Inc., Hauppauge, N.Y.**

**Filed Jan. 14, 1977, Ser. No. 759,374**

**Int. Cl.[2] H04N** *7/00, 7/04*

**U.S. Cl. 358—83** **4 Claims**

1. In combination in a system for distributing a mixture of television programs with monaural audio and television programs with stereophonic audio comprising a video and left and right audio signals, via an electromagnetic communications link, means for supplying a video signal and an audio signal comprising at varying times one of a monaural signal, and left and right stereophonic audio signals, signal generator means including means for generating a main carrier modulated on a frequency division multiplexed basis with said video signal and with first and second subcarriers each modulated with a different one of said left and right audio signals when a television program with stereophonic audio is being processed, means for modulating said first subcarrier with the monaural audio when a monaural television signal is being processed, means for further modulating at least one of said subcarriers with a characteristic signal identifying the incidence of a stereophonic transmission, and at least one first receiving means for receiving television programs originated by said signal generating means via said electromagnetic transmission, each of said first receiving means comprising means for demodulating said first and second subcarriers, an audio output port, means connected to said demodulating means for summing the first and second subcarrier modulation outputs of said demodulating means, controlled switching means for connecting said audio output port with the first subcarrier modulation output of said demodulating means and to the output of said summing means, and characteristic detector means connected to said demodulating means and responsive to the incidence of said characteristic signal for controlling said switching means to connect said audio output port to the output of said summing means.




---

## 4,148,061
## SCANNING APPARATUS AND METHOD

**Jerome H. Lemelson, 85 Rector St., Metuchen, N.J. 08841**

**Continuation of Ser. No. 254,710, May 18, 1972, which is a continuation-in-part of Ser. No. 267,377, Mar. 11, 1963, which is a continuation-in-part of Ser. No. 626,211, Dec. 4, 1956, Pat. No. 3,081,379, which is a continuation-in-part of Ser. No. 477,467, Dec. 24, 1954, abandoned. This application Mar. 16, 1977, Ser. No. 778,331**

**Int. Cl.[2] H04N** *7/18*

**U.S. Cl. 358—101** **7 Claims**

1. An automatic inspection apparatus comprising:

(a) means for supporting an article to be inspected at an inspection location,

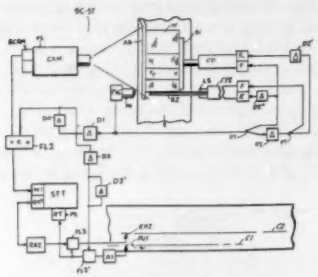
(b) electro-optical scanning means disposed at said inspection location for examining articles to be inspected,

(c) said scanning means providing information signals including information concerning said articles as they are inspected,

(d) means for operating said article supporting means to move an article relative to said electro-optical scanning means,

(e) analyzing circuit means operable for receiving information signals from said scanning means and including means to analyze the information content of said signals, and

(f) detection means operable when an article is disposed at said inspection location for effecting the transmission of



signals generated inspecting the article from said scanning means to said analyzing circuit.

---

**4,148,062**

## TELEVISION-BASED ALARM SYSTEM

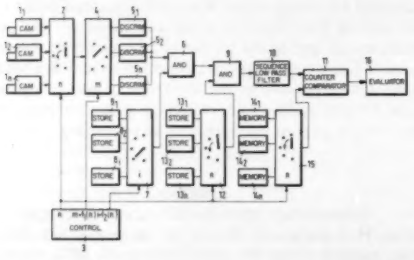
**Gerhard Kamin, Traisa, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

**Filed Apr. 15, 1977, Ser. No. 787,956**

**Claims priority, application Fed. Rep. of Germany, Apr. 17, 1976, 2617112**

**Int. Cl.[2] H04N *7/18***

**U.S. Cl. 358—105** **43 Claims**



1. An alarm system for detecting movement or change in the field of view supervised by a television camera, the system comprising a discriminator responsive to the video signal produced by the camera and adapted to produce a digital signal, (hereinafter referred to as a discriminator signal, upon the occurrence of a predetermined characteristic in the picture content of the video signal, at least one means for providing in synchronism with the video signal from the camera a masking signal defining one or more portions of the field of view from which discriminator signals are not required, means for logically coupling the at least one masking signal and the digital discriminator signals in order to remove any discriminator signals derived from the said one or more portions of the field of view, means for counting the number of discriminator signals from the logical coupling means which occur in a predetermined time interval, and means for comparing the sum so formed with a sum formed by counting the discriminator signals which occurred during a previous time interval of the same duration and for generating a further signal when the sums differ by a predetermined amount.

**4,148,063**

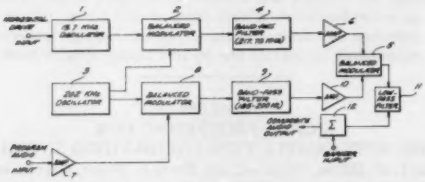
## METHOD AND APPARATUS FOR ENCODING AUDIO SIGNALS IN TELEVISION SYSTEMS

**Marc Chomet, East Northport, N.Y., assignor to Teleglobe Pay-TV System, Inc., Rego Park, N.Y.**

**Filed Apr. 28, 1977, Ser. No. 792,058**

**Int. Cl.[2] H04N *7/16***

**U.S. Cl. 358—114** **8 Claims**



1. In a television system adapted to transmit video signals and accompanying audio program signals, said system having means for furnishing a sequence of horizontal signals at a horizontal drive frequency, a method for encoding said audio program signals, comprising, in combination, the steps of limiting said program audio signals to a predetermined audio frequency range extending from a lower limiting frequency to an upper limiting frequency; creating an unmodulated carrier wave having a carrier wave frequency corresponding to said horizontal drive frequency; amplitude modulating said audio program signals onto said carrier wave, thereby creating a modulated carrier wave having a first and second sideband; and suppressing said carrier wave and one of said sidebands and furnishing a single sideband signal having a coded frequency range corresponding to said predetermined audio frequency range and extending from a coded lower limiting frequency to a coded upper limiting frequency, respectively corresponding to said upper and lower limiting frequencies of said predetermined audio frequency range, said single sideband signal constituting an encoded audio program signal.

---

**4,148,064**

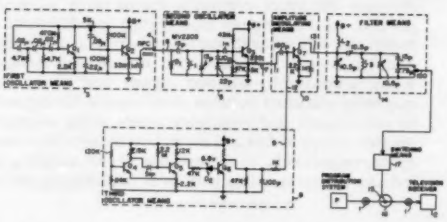
## JAMMING CIRCUIT FOR TELEVISION SIGNALS

**Frederick F. Reed, El Paso, Tex., assignor to GTE Sylvania Incorporated, Stamford, Conn.**

**Filed Jan. 9, 1978, Ser. No. 868,035**

**Int. Cl.[2] H04N *1/44***

**U.S. Cl. 358—118** **4 Claims**



1. A circuit for transmitting a jamming signal for disrupting coherence of a television signal which is transmitted along a guided path toward at least one television receiver, said television signal having a video-carrier-frequency component, an audio-carrier-frequency component and a horizontal-sweep-frequency component, said circuit comprising:

a first oscillator means having an output terminal providing a first signal having a substantially sinusoidal voltage time varying at an audio-frequency rate;

a second oscillator means having a frequency-control terminal coupled to said output terminal of said first oscillator means, and having an output terminal providing a second signal having a substantially constant-amplitude sinusoidal

voltage frequency modulated by said first signal between the frequency of said video-carrier-frequency component and the frequency of said audio-carrier-frequency component inclusively;

a third oscillator means having an output terminal providing a third signal having a substantially square-wave voltage time varying at substantially the frequency of said horizontal-sweep-frequency component;

an amplitude-modulating means having a first input terminal coupled to said output terminal of said second oscillator means, having a second input terminal coupled to said output terminal of said third oscillator means and having an output terminal providing said jamming signal comprised of said second signal amplitude modulated by said third signal with maximum amplitude substantially equal to the unmodulated amplitude of said video-carrier frequency component and minimum amplitude substantially equal to less than ten percent of said maximum amplitude;

directional-coupling means having an input terminal and a directional-output terminal, said input terminal of said directional-coupling means coupled to said output terminal of said amplitude-modulating means and said directional-output terminal of said directional-coupling means coupled to said guided path to direct said jamming signal toward said one television receiver.

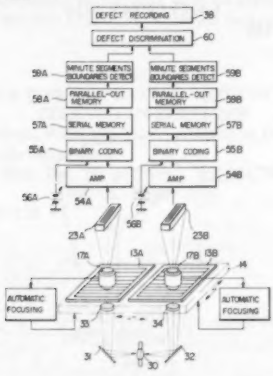
---

**4,148,065**

## METHOD AND APPARATUS FOR AUTOMATICALLY INSPECTING AND CORRECTING MASKS

**Kiyoshi Nakagawa; Soichi Toorisawa, both of Tokyo; Hiroyuki Ibe; Shigeaki Nakashima, both of Kodaira, and Yasuhiko Hara, Yokohama, all of Japan, assignors to Hitachi, Ltd., Japan**

**Filed Jan. 25, 1977, Ser. No. 762,270**
**Claims priority, application Japan, Dec. 8, 1976, 51-146512**
**Int. Cl.[2] H06N *7/18***
**U.S. Cl. 358—101** **12 Claims**




1. A method of inspecting mask patterns used for forming a desired oxide pattern or a desired wiring pattern on a semiconductor wafer by disposing the mask patterns of the semiconductor wafer on the surface in close contact thereto or with a predetermined gap therefrom and wherein each mask pattern is formed of a layer of an opaque material of a predetermined pattern deposited on a surface of a transparent substrate comprising the steps of:

preparing at least two similar mask patterns;

converting the mask patterns into electric signals respectively;

converting said electric signals into binary signals on the basis of at least one reference value; and

comparing said binary signals and discriminating the existence of a defect in said mask patterns by the coincidence and noncoincidence of the binary signals of said two patterns, wherein said comparing of said binary signals of said two mask patterns is carried out in a predetermined plurality of bits corresponding with the minimum pattern width of said two mask patterns respectively.

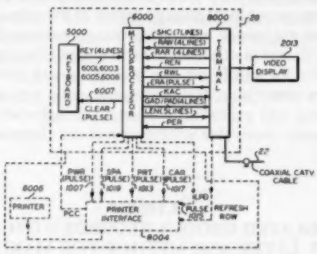
---

**4,148,066**

## INTERFACE FOR ENABLING CONTINUOUS HIGH SPEED ROW GRABBING VIDEO DISPLAY WITH REAL TIME HARD COPY PRINT OUT THEREOF

**Richard Saylor, Monsey, N.Y., assignor to IDR, Inc., Farmingdale, N.Y.**

**Continuation-in-part of Ser. No. 611,843, Sep. 10, 1975, Pat. No. 4,042,958. This application Apr. 23, 1976, Ser. No. 679,907**
**Int. Cl.[2] H04N *7/00, 7/08, 5/76***
**U.S. Cl. 358—127** **71 Claims**




1. A printer interface for interfacing a hard copy printer means with a real time frame grabbing video display terminal for enabling substantially instantaneous provision of a continuous direct video display of a selectable predetermined video frame of information on a video display means from continuously receivable information remotely provided over a transmission media while substantially simultaneously providing real time hard copy printing of said selectable predetermined video frame of information on said printer means, said continuously receivable information comprising a plurality of pseudo video scan lines, each of said pseudo video scan lines having a television video scan line format and capable of comprising a complete self-contained packet of digital information sufficient to provide an entire displayable row of video data characters, said displayable row comprising a plurality of television video scan lines, each of said characters comprising a plurality of bits for each of said television video scan lines, said pseudo video scan line having an associated transmission time equivalent to said television video scan line, said packet of digital information comprising at least address information for said displayable row and data information for said displayable characters in said displayable row, said pseudo video scan line being a composite video signal, said terminal comprising means for selecting said predetermined video frame to be continuously displayed and means operatively connected to said video display means and said frame selection means for processing said composite pseudo video scan line signals and capable of providing a displayable video row signal to said video display means from each of said pseudo video scan line signals pertaining to said selected frame for providing said continuous video display, said processing means comprising means for providing a master clock signal output, said terminal further comprising decoder means operatively connected to said master clock signal output for providing timing control signals for said processing means indicative of predetermined character position within said pseudo video scan line signal and predetermined bit positions within a character for processing said pseudo video scan line to provide said displayable video row signal therefrom, said plurality of television video scan lines comprising said displayable video row signal; said processing means further comprising local storage means operatively connected to said decoder means and said video display means

for locally storing said displayable video row signal by said characters by said predetermined bit and character positions; said interface comprising bit counting means operatively connected to said decoder means and said processing means local storage means for incrementally advancing a predetermined count for each of said television video scan lines comprising said displayable row, buffer storage means for locally storing said hard copy printable information operatively connected to said printer means and said processing means local storage means for providing a hard copy printable signal to said printer means therefrom, said hard copy printable signal comprising a plurality of printable characters, each of said printable characters comprising a plurality of bits, and multiplexer control means operatively connected to said buffer storage means and said bit counting means for controlling the loading into said buffer means of one bit position of each of said characters for each of said television video scan lines locally stored in said processing means local storage means at the rate at which said characters are loaded into said processing means local storage means with said multiplexer control means selecting a different bit position for a different one of each of said television video scan lines comprising said displayable row, whereby said bits comprising said printable characters are selectable from said continuously receivable information at the character reception rate.

---

**4,148,067**

## MODULATED GROOVE RECORDS WITH A THICK METAL LAYER AND METHOD FOR MAKING SAME

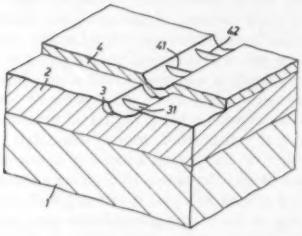
**Lyn Holt, Maidenhead, England, assignor to E M I Limited, Hayes, England**

**Filed Mar. 5, 1976, Ser. No. 664,068**

**Claims priority, application United Kingdom, Mar. 7, 1975, 9505/75**

**Int. Cl.[2] H04N *5/76*; G11B *3/70***

**U.S. Cl. 358—128** **22 Claims**




1. A method of making a modulated groove record on which information is stored by the groove modulation including providing on a support a layer of a conductive material in the form of a metal foil and having a modulated record groove surface, the thickness of said layer being at least twenty times the depth of said groove, and causing material of the layer to form a dielectric coating including material of the layer and following the shape of said modulated surface.

---

**4,148,068**

## TELEVISION SYNCHRONIZING SIGNAL SEPARATING CIRCUIT

**Judson A. Hofmann, Schaumberg, Ill., assignor to Zenith Radio Corporation, Glenview, Ill.**

**Filed Jun. 2, 1977, Ser. No. 802,698**

**Int. Cl.[2] H04N *5/08***

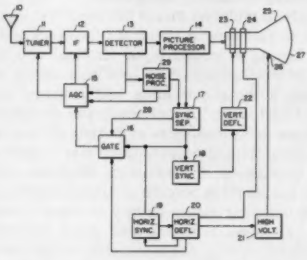
**U.S. Cl. 358—153** **9 Claims**

1. A synchronizing signal separation circuit for use in a television receiver having a source of composite video signal which includes modulation components of picture information together with vertical and horizontal display synchronizing information, said separation circuit comprising:

a transistor amplifier having input, common, and output electrodes;

means D.C. coupling said input electrode to said source of said composite signal;

means coupling said output electrode to a source of operating potential; and




clamp means coupled to said common electrode producing a bias potential thereon with respect to said input electrode whereby said transistor conducts only during said synchronizing signals at a level such that saturation of said transistor is avoided.

---

**4,148,069**

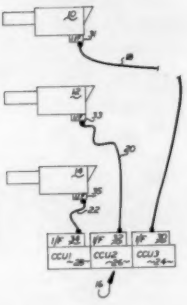
## AUTOMATIC CABLE LOSS COMPENSATOR FOR USE IN A TELEVISION CAMERA SYSTEM

**Charles F. Smiley, and Robert R. Weirather, both of Quincy, Ill., assignors to Harris Corporation, Cleveland, Ohio**

**Filed Feb. 14, 1977, Ser. No. 768,099**

**Int. Cl.[2] H04N *5/14***

**U.S. Cl. 358—160** **6 Claims**




1. In a televison camera system wherein a television camera head communicates with a remote camera control unit by means of a broadband RF signal communicated over a transmission cable of arbitrary length, compensating apparatus for automatically compensating for the arbitrary amount of attenuation of said RF signal caused by said arbitrary length of cable, said compensating apparatus comprising:

cable attenuation detector means responsive to said RF signal for providing a control signal having a value dependent on whether the peak amplitude of said RF signal is above or below a preselected reference level;

first means in the path of said RF signal for providing a substantially fixed change in the gain of said signal; and,

bypassing means for selectably bypassing said first means or not, in accordance with the value of said control signal.

## 4,148,070
## VIDEO PROCESSING SYSTEM

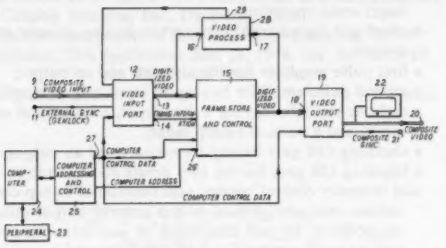
**Richard J. Taylor, London, England, assignor to Micro Consultants Limited, Berkshire, England**

**Filed Jan. 31, 1977, Ser. No. 764,317**

**Claims priority, application United Kingdom, Jan. 30, 1976, 3731/76**

**Int. Cl.[2] H04N** *5/14*

**U.S. Cl. 358—160** **11 Claims**




1. A video processing system comprising:

(a) analogue to digital converter means for receiving a video signal and converting said signal into digital form;

(b) a digital frame store for receiving and storing the converted video data;

(c) store addressing means for addressing locations within the frame store to write in and read out data therefrom;

(d) digital to analogue converter means for receiving data read out from said frame store and for converting the data into analogue form; and

(e) accessing means for providing random access to the frame store locations during the video blanking time to allow processing of the data with an algorithm so as to modify the data held at the accessed location in the store.

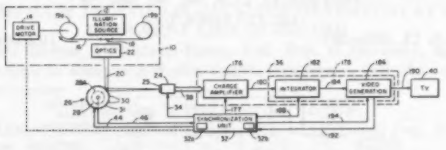
## 4,148,071
## APPARATUS FOR DISPLAYING MOVING FILM ON A TELEVISION RECEIVER

**Michael Zinchuk, Waltham, Mass., assignor to Polaroid Corporation, Cambridge, Mass.**

**Filed Dec. 30, 1977, Ser. No. 865,786**

**Int. Cl.[2] H04N** *3/36*

**U.S. Cl. 358—214** **16 Claims**




1. Apparatus for converting the video information from a multiframe transparent film strip to a television transmission signal suitable for receipt by a conventional television receiver which can display the video information derived from the film strip, said apparatus comprising:

an elongated lineal array comprising a plurality of photosensitive elements for converting video information to electrical signal information;

means for projecting an image of the film strip, said projecting means comprising a source of illumination together with a motor for moving the film strip past the illumination source at a generally uniform rate of speed;

movable reflecting means stationed to receive said projected light from the film strip and redirecting the projected light onto said lineal array in a manner such that the projected image from each successive film frame is scanned by said lineal array in accordance with a predetermined film frame scanning sequence;

drive means for moving said reflecting means;

means for sequentially sampling the output of said lineal array and for converting said sampled signals to a television transmission signal suitable for transmission to a television receiver in order to display the video information received by said linear array; and

control means for synchronizing said projecting means motor with said drive means so that said lineal array scans each film frame at a rate compatible with the field rate of the conventional television receiver.

## 4,148,072
## CAMERA SYSTEM INCLUDING A STILL OR MOTION PICTURE CAMERA AND A TV CAMERA

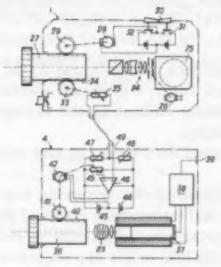
**Karl Vockenhuber, 118 Potzleinsdorferstrasse, 1180 Vienna, Austria, assignor to Karl Vockenhuber and Raimund Hauser, both of Vienna, Austria**

**Filed May 5, 1976, Ser. No. 683,676**

**Claims priority, application Austria, May 5, 1975, 3429/75**

**Int. Cl.[2] H04N** *5/30, 5/30*

**U.S. Cl. 358—224** **8 Claims**



1. A camera system comprising, in combination, a photographic camera means of the still or motion picture type for photographing an object field, a TV camera having a first lens means for providing a variable object angle, said photographic camera means having a second lens means for providing a variable object angle less than or equal to said object angle of said TV camera lens means independently thereof, means for adjusting said second lens means to different object angle settings, means for providing an electrical signal in said photographic camera means corresponding to said photographic camera lens means object angle settings, said TV camera comprising an electrically-operated servomechanism means for adjusting the object field of said TV camera lens means, means for providing said electrical signal from said photographic camera to said servomechanism means, said servomechanism means comprising means for adjusting the object field of said TV camera lens means corresponding to said object angle setting of said photographic camera lens means.

## 4,148,073
## HIGH SPEED VIDEO DISPLAY SYSTEM INCLUDING ZOOM FEATURE

**Gregory E. Slobodzian, Chicago; Robert A. Payne, Des Plaines, and Wayne Fiedler, Chicago Ridge, all of Ill., assignors to Stewart-Warner Corporation, Chicago, Ill.**

**Filed Dec. 28, 1977, Ser. No. 865,329**

**Int. Cl.[2] H04N** *3/12*

**U.S. Cl. 358—240** **21 Claims**

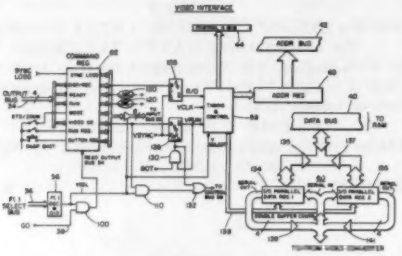
10. A high speed system for displaying a video image on a plurality of variable intensity display devices, said image reproducing a frame of video information received in raster form from a video source, said system capable of at least two modes of operation, a first mode producing a magnified or enlarged

image of only a selected portion of said video frame on said display devices and a second mode reproducing substantially all of said video frame on said display devices without enlargement, said system comprising:

(a) video converter means for receiving said video information from said source and converting it into digital format, said converting means including means for producing digital data representative of all or a selected portion of said video frame at a selectable conversion rate,

(b) means for choosing the portion of said frame to be digitized,

(c) a display buffer memory capable of storing the digital data representing the selected portion of said video frame,



(d) a video interface receiving said digital data and transmitting it to said display buffer, said interface including means for sequentially addressing the storage locations in said buffer memory,

(e) first bus means for connecting said video interface to said buffer,

(f) a display interface for retrieving said digital data from said buffer and transmitting it to said display devices, said display interface including address means for extracting the data from said buffer in a sequence different than the sequence used to store the data in the buffer,

(g) computer means for controlling the transfer of data between the interfaces, the display buffer, the converter and the display devices.

---

**4,148,074**

## CATHODE-RAY TUBE DISPLAY

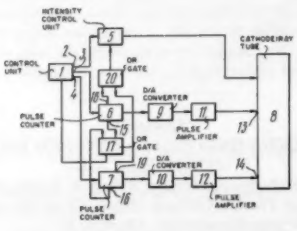
**Alexei P. Stakhov, ulitsa Chekhova, 49, kv. 16, Taganrog Rostovskoi oblasti, U.S.S.R.**

**Filed Dec. 16, 1977, Ser. No. 861,413**

**Claims priority, application U.S.S.R., Dec. 22, 1976, 2433409[I]**

**Int. Cl.[2] H04N *7/02***

**U.S. Cl. 358—242** **1 Claim**



1. A cathode ray tube comprising,

a control unit having an intensity control output, a horizontal sweep control output, a vertical sweep control output, and a fault acknowledgement input;

an intensity control unit having a data input, a blanking input, and an output;

a first pulse counter which is able to perform Fibonacci code operations;

a second pulse counter which is able to perform Fibonacci code operations;

each of said pulse counters having a data output, a fault acknowledgement output, a transient output, and a counting output;

a first digital-analog converter which is able to perform Fibonacci code operations;

a second digital-converter which is able to perform Fibonacci code operations;

each of said digital-analog converters having an input and an output;

a first pulse amplifier having an input and an output;

a second pulse amplifier having an input and an output;

a cathode-ray tube having a data input, a horizontal sweep input, and a vertical sweep input;

a checking OR gate having two inputs and an output;

a blanking OR gate having two inputs and an output;

said intensity control output, said horizontal sweep control output, and said vertical sweep control output coupled, respectively, to said data input of said intensity control unit, to said counting input of said first pulse counter, and to said counting input of said second pulse counter;

said data outputs of said first and second pulse counters, coupled to said inputs of said first and second digital-analog converters, respectively;

said outputs of said first and second digital-analog converters, coupled to said inputs of said first and second pulse amplifiers, respectively;

said outputs of said first and second pulse amplifiers, coupled, respectively, to said horizontal sweep input and to said vertical sweep input of said cathode-ray tube;

said inputs of said checking OR gate, coupled to said fault acknowledgement outputs of said first and second pulse counters;

said output of said checking OR gate, coupled to said fault acknowledgement input of said control unit;

said inputs of said blanking OR gate, coupled to said transient outputs of said first and second pulse counters;

said output of said blanking OR gate, coupled to said blanking input of said intensity control unit.

---

**4,148,075**

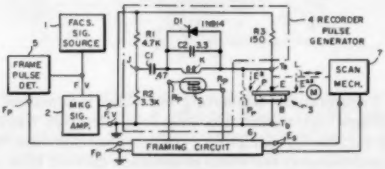
## FRAMING SIGNAL GENERATOR FOR ELECTRICAL RECORDERS

**Gerald L. Vano, Brockton, Mass., assignor to Alden Research Foundation, Westboro, Mass.**

**Filed Jan. 12, 1978, Ser. No. 868,758**

**Int. Cl.[2] H04N *5/12***

**U.S. Cl. 358—267** **10 Claims**



1. In electrical recording apparatus including scan means for marking through an electrosensitive web with graphic electric signals including a framing signal, the apparatus including framing means for comparing a start of scan signal with the framing signal, a start of scan signal generator comprising:

circuit means adapted to be coupled between the scan means and the framing means, the circuit means including means for sensing alteration of the framing signal voltage drop through the web during scans; and

switching means responsive to alteration of the voltage drop to produce a start of scan signal for comparison with the

framing signal so that asynchronism of the framing signal and start of scan signal causes the framing means to bring the two signals into phase when the framing signals are framed on the web.

---

**4,148,076**

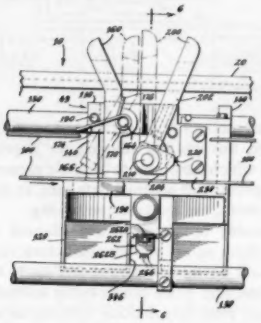
## FACSIMILE MACHINE

**Matthew J. Costello, Bethel; Thomas K. Saunders, New Milford, and Albert M. DeLuca, New Fairfield, all of Conn., assignors to Graphic Sciences, Inc., Danbury, Conn.**

**Continuation-in-part of Ser. No. 792,541, May 2, 1977, abandoned. This application Jan. 24, 1978, Ser. No. 871,910**

**Int. Cl.[2] H04N** *1/06, 1/24*

**U.S. Cl. 358—286** **10 Claims**



1. A facsimile machine comprising

a housing,

a cylinder, in said housing adapted to carry a sheet of paper on which a message is to be written or which carries a message to be read, and

a read-write assembly disposed adjacent to said cylinder and the sheet of paper carried thereby,

said assembly including two manually operable levers, one for positioning said assembly with respect to said cylinder and one for setting said assembly in its read or write operating mode.

---

**4,148,077**

## METHOD OF PLAYING BACK VIDEO RECORDS THROUGH TELEVISION RECEIVER OPERATING AT A DIFFERENT LINE STANDARD

**Peter Bragas, Hildesheim-Itzum, Fed. Rep. of Germany, assignor to Blaupunkt-Werke GmbH, Hildesheim, Fed. Rep. of Germany**

**Filed Aug. 8, 1977, Ser. No. 822,521**

**Claims priority, application Fed. Rep. of Germany, Aug. 14, 1976, 2636772**

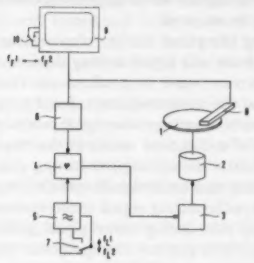
**Int. Cl.[2] H04N** *5/02;* **G11B** *19/28*

**U.S. Cl. 360—10** **2 Claims**

1. A method of playing back a video record recorded at a first picture line scanning frequency ($f_L1$) and at a first picture field scanning frequency ($f_F1$) by means of a playback pick-up and a television receiver designed for operation at a second picture line scanning frequency ($f_L2$) and normally used for television reception at a second picture field scanning frequency ($f_F2$) comprising the steps of:

playing back a video record recorded at said first line and field scanning frequencies on a pick-up at a relative speed of the record with respect to the pick-up such as to reproduce the recorded picture lines at said second picture line scanning frequency ($f_L2$) and

operating a television receiver with its video circuit input connected to the pick-up output with the horizontal deflection circuits of said receiver operating at said second picture line scanning frequency ($f_L2$) and with vertical



deflection circuits of said receiver set for operation at said first picture field scanning frequency ($f_F1$).

---

**4,148,078**

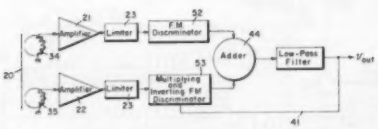
## NOISE REDUCTION APPARATUS

**Herbert S. Riddle, Jr., 50 Oak Rd., Canton, Mass. 02021**

**Continuation of Ser. No. 681,759, Apr. 20, 1976, abandoned, which is a continuation of Ser. No. 459,071, Apr. 8, 1974, abandoned. This application Aug. 29, 1977, Ser. No. 828,425**

**Int. Cl.[2] G11B** *5/04*

**U.S. Cl. 360—27** **12 Claims**




1. Apparatus for reducing common factor noise in a frequency-modulated data stream, using a reference stream, the apparatus comprising:

(a) a data-stream device which transforms a frequency-modulated first data stream represented by $f_c(1 + m)(1 + F)$ where $f_c$ equals a pure carrier frequency, m equals a pure data modulation, and F is the noise factor, into a second data stream representing the value $m + F(1 + m)$,

(b) a reference-stream device which transforms a third reference stream representing the value $f_R(1 + F)$, where $f_R$ is a reference frequency, and a fourth feedback stream, representing the value m, into a fifth stream representing the value $-F(1 + m)$,

(c) a combiner which combines the second and fifth streams to generate the value m, and

(d) a feedback loop which feeds the value m back to the reference-stream device.

---

**4,148,079**

## CORRECTION OF RAPID PERIODIC TIMING ERRORS IN THE PRODUCTION OF TAPE-RECORDED COLOR TELEVISION SIGNALS AND THE LIKE

**Winfried Horstmann, Griesheim, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

**Continuation-in-part of Ser. No. 827,990, Aug. 26, 1977, abandoned. This application Oct. 7, 1977, Ser. No. 840,217**

**Claims priority, application Fed. Rep. of Germany, Aug. 28, 1976, 2638869**

**Int. Cl.[2] H04N** *5/795*

**U.S. Cl. 360—36** **7 Claims**

1. A method of correcting rapid periodic time errors in the reproduction of signals including periodic synchronizing signals and a reference carrier wave, from a dynamic signal stor-

ing device on which each successive cycle of said signals are recorded as a set of record tracks in which the record of said synchronizing signals are progressively offset from line to line, comprising the steps of:

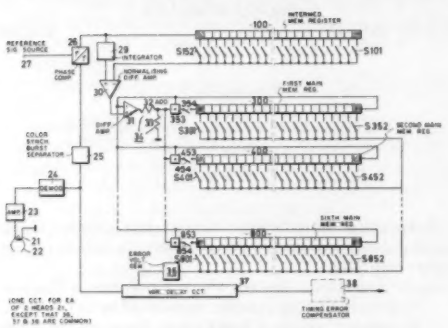
comparing the phase of the reference carrier wave reproduced from said signal storing device with a local reference carrier wave to produce raw timing error signal pulses at the recurrence rate of said synchronizing pulses;

storing the said timing error signal pulses which correspond to one of said record tracks in the respective cells of an intermediate storage register having a multiplicity of cells by writing said error signals into said register sequentially at the synchronizing signal recurrence rate;

integrating said timing error signal pulses to provide an average value thereof averaged over the period required for reading said track;

sequentially retrieving the timing error signals stored in said intermediate storage register cells in order of storing at the synchronizing signals recurrence rate and comparing said retrieved signals as they are retrieved with said average value to produce a train of normalized timing error signal pulses;

comparing each of said normalized timing error signal pulses sequentially with a corresponding pulse, if any, stored in a previous cycle, adding a signal proportional to the comparison result to a signal proportional to said corresponding pulse and storing the resulting sum signal in a first main storage register in a position in said first main storage register corresponding to the order in which said sum signal is produced, using the previously and similarly stored sum signal, if any, in said position in said first main storage register as said corresponding pulse for these comparing and adding steps;




repeating the foregoing steps as many times as necessary to store as many trains of sum signals in as many main storage registers, as there are recorded tracks in each said set of tracks, each alternate repetition utilizing a different one of two intermediate storage registers;

reading said sum signals sequentially and nondestructively by reading, in turn, one signal from a cell of each of said main registers in a substantially regular sequence in which the contents of the cells of each main register are read in the order in which they were stored, and the main registers are read in the order in which the tracks to which their contents relate were recorded and reproduced, taking advantage of the time stagger of the reading of the cells in the respective main registers to obtain as many read-out sum pulses per synchronizing pulse interval as there are record tracks in each said set of tracks, and

utilizing said read-out sum pulses to produce recurring timing corrections of signals reproduced from said record.

**4,148,080**

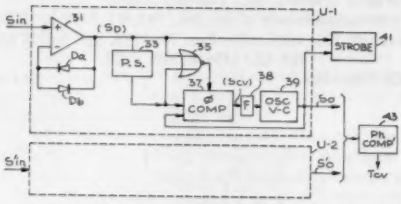
## DI-BIT RECORDING TECHNIQUE AND ASSOCIATED SYSTEM

**Herbert U. Ragle, and Norman S. Blessum, both of Thousand Oaks, Calif., assignors to Burroughs Corporation, Detroit, Mich.**

**Continuation-in-part of Ser. No. 807,155, Jun. 16, 1977. This application Aug. 1, 1977, Ser. No. 820,868**

**Int. Cl.[2] G11B** *5/09, 27/10*

**U.S. Cl. 360—51** **6 Claims**




1. An improved method of detecting and reading-out digital recording signals, this method adapted for improving signal detection means which functions to provide prescribed output data pulses at a prescribed nominal data rate, as controlled by output control means, the method comprising:

providing variable oscillator means adapted to generate prescribed clock pulses at a nominal clock-rate, synchronous with said nominal data rate, and apply these to said control means, said clock pulses being normally synchronized to occur relatively midway between adjacent of said nominal data pulses;

and providing associated phase compare means adapted to receive said data pulses as well as said clock pulses and to determine their synchronism and to provide a "compare-output" representing the extent of variance from said nominal data rate and apply this compare-output to said oscillator means and further providing gating means adapted to allow said compare means output to be applied to said oscillator means only when a data pulse occurs;

this compare output thus providing a measure of the variance from said "mid-position" of said clock pulses and the "mid-position" between adjacent data pulses and accordingly serving to control and modulate said clock rate so as to maintain correspondence with, and synchronism with a varying data rate by causing said clock oscillator means to accelerate or decelerate said clock rate in accordance with the varying data rate.

---

**4,148,081**

## VOLUME CONTROLLED TAPE END ALARM FOR TAPE RECORDER

**Ken Satoh, Hachioji, Japan, assignor to Olympus Optical Company, Ltd., Tokyo, Japan**

**Filed Dec. 15, 1977, Ser. No. 860,834**

**Claims priority, application Japan, Dec. 20, 1976, 51-171355[U]**

**Int. Cl.[2] G11B** *15/06*

**U.S. Cl. 360—67** **8 Claims**

1. A tape recorder, including a tape end warning apparatus, said tape recorder comprising:

(A) a microphone for converting an acoustical signal into an electrical signal;

(B) alarm signal generating means for generating an oscillating signal responsive to the detection of an end of tape condition;

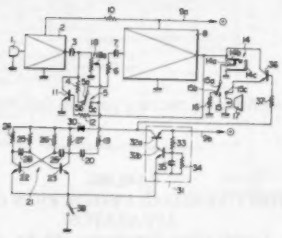
(C) means for generating a playback signal representative of magnetic information stored on a magnetic record medium;

(D) human actuatable switch means for selectively placing said recorder in a record or playback mode;

(E) audio amplifier means for amplifying an audio frequency signal applied thereto;

(F) means responsive to the audio frequency signal amplified by said audio amplifier means for generating a magnetic recording signal when said recorder is in said record mode, for generating an acoustical playback signal when said recorder is in said playback mode, and for generating an acoustical alarm signal when said alarm signal generating means generates said oscillating signal;

(G) means, including an automatic gain control circuit, for applying a varying percentage of said electrical signal to said audio amplifier when said recorder is in said record mode, said varying percentage being determined by said automatic gain control circuit in such a manner that said recorder records at a constant recording level; and



(H) means, including a variable resistor, for:

(1) applying a first percentage of said playback signal to said audio amplifier when said recorder is in said playback mode, said first percentage being determined by the setting of said variable resistor whereby said variable resistor operates to control the playback volume of said tape recorder when said tape recorder is in a playback mode; and

(2) applying a second percentage of said oscillating signal to said audio amplifier when said recorder is in said record mode, said second percentage being determined by the setting of said variable resistor whereby said variable resistor operates to control the volume of said acoustical alarm signal when said recorder is in said record mode.

---

**4,148,082**

## TRACKING CONTROL APPARATUS

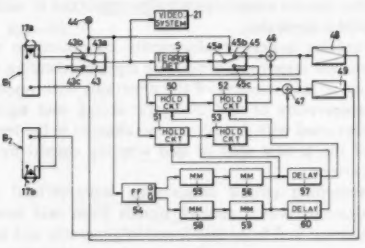
**Hidehiko Okada, Yokohama; Minoru Morio, Tokyo; Masahiro Kambara, Tokyo, and Yukio Kubota, Tokyo, all of Japan, assignors to Sony Corporation, Tokyo, Japan**

**Filed Sep. 14, 1977, Ser. No. 833,346**

**Claims priority, application Japan, Sep. 13, 1976, 51-109672**

**Int. Cl.[2] G11B *5/58***

**U.S. Cl. 360—77** **16 Claims**



1. Tracking control apparatus for a signal reproducing system of the type wherein at least one transducer scans successive parallel tracks on a record medium in which information signals are recorded, said apparatus comprising:

transducer means adapted for relative movement into a reproducing relation with respect to said record medium for reproducing the signals recorded in a given track;

detecting means for detecting a deviation between the scanning trace of said transducer means across said record medium and said given track and for producing a control signal as a function of said detected deviation;

adjustable support means for said transducer means, said adjustable support means being responsive to said control signal to displace said transducer means transversely of said given track in accordance with said control signal;

means for storing a predetermined sample of the control signal produced while said transducer means scans said given track; and

means for supplying said predetermined sample to said adjustable support means prior to the time that said transducer means moves into a subsequent reproducing relation with respect to said record medium so that said transducer means is pre-displaced before signals are next reproduced thereby.

---

**4,148,083**

## REPRODUCING SYSTEM HAVING SCANNING TRANSDUCER MEANS WHICH ARE SELECTIVELY DEFLECTABLE TO AVOID TRACKING ERRORS

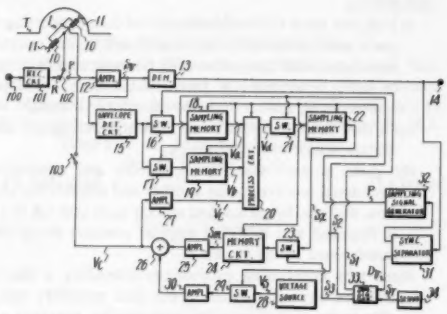
**Yoshimi Watanabe, Yokohama, Japan, assignor to Sony Corporation, Tokyo, Japan**

**Filed Aug. 19, 1977, Ser. No. 826,199**

**Claims priority, application Japan, Aug. 20, 1976, 51-99962**

**Int. Cl.[2] G11B *21/10***

**U.S. Cl. 360—77** **11 Claims**



1. A reproducing system for reproducing signal from a record medium, which signals are recorded in successive, parallel tracks, comprising:

at least one transducer means movable relative to said record medium to scan said successive parallel tracks in respective scanning paths for reproducing said recorded signals;

drive means for driving said transducer means along said respective scanning paths;

deflecting means for coupling said transducer means to said drive means, said deflecting means being responsive to a deflection control signal for deflecting the transducer means coupled thereto in a direction transversely to the longitudinal direction of the track being scanned so as to deflect said scanning path of said transducer means;

means for supplying a constant deflection control signal component to said deflecting means when said transducer means scans predetermined ones of said tracks so as to deflect said transducer means by a predetermined amount;

means for detecting a first envelope of the signals reproduced by said transducer means when said transducer means scans said predetermined ones of said tracks;

means for detecting a second envelope of the signals reproduced by said transducer means when said transducer means scans predetermined other tracks;

comparing means for comparing said first envelope to said second envelope to produce an error signal;

storage means for storing said error signal; and means for supplying said stored error signal to said deflecting means as a deflection control signal when said transducer means scans selected tracks.

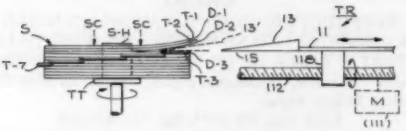
---

**4,148,084**

## FLEXIBLE DISK PACK, RELATED STORAGE APPARATUS HAVING DISKS WITH CIRCUMFERENTIAL TAB SEGMENTS AND ASSOCIATED PARTITION MEANS

**Ko Ko Gyi, Thousand Oaks, Calif., assignor to Burroughs Corporation, Detroit, Mich.**

**Filed Jul. 5, 1977, Ser. No. 813,079**
**Int. Cl.[2] G11B *5/82, 25/04***
**U.S. Cl. 360—98** **21 Claims**




1. An improved automatically partitionable disk pack array comprising:

at least one stack of like flexible digital data processing disks, each stack adapted to be rotated and to be operatively associated with data processing transducer means, as well as being automatically partitionable so as to expose a selected disk surface for said transducer means;

each disk having a prescribed, like projecting tab along a certain sector of its periphery;

the disks in each stack being fixedly and concentrically associated relative to one another and adapted for co-rotation, and also being stacked so that each said tab in a stack is disposed at a different angular position about the circumference of the stack;

these tabs comprising projections extending a like radial distance beyond the rest of the disk periphery and, thus able to be rotated so as to, sequentially, intercept a common "select-locus", this locus disposed at a prescribed radial distance from stack center so that automatic partitioning means can deflect a selected projecting tab and provide accessing for the associated transducer means.

---

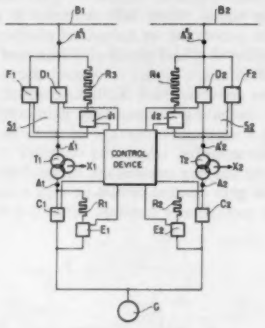
**4,148,085**

## INTERCONNECTION CIRCUIT-BREAKER AND ELECTRIC POWER INSTALLATION EMPLOYING SAME

**Doan Pham Van, Meyzieu, France, assignor to Delle-Alsthom, Villeurbanne, France**

**Filed Nov. 21, 1977, Ser. No. 853,789**
**Claims priority, application France, Nov. 24, 1976, 76 35363**
**Int. Cl.[2] H01H *33/16***
**U.S. Cl. 361—13** **9 Claims**

1. A high-voltage circuit-breaker comprising; at least one main rapid-opening cut-out chamber, means for connecting said main cut-out chamber in parallel firstly in a circuit comprising a resistor for limiting the short-circuit current and an auxiliary cut-out chamber having a cut-out power corresponding to this limit current and secondly in a circuit comprising a rapid closing chamber, and means for operating said circuit-breaker such that said main cut-out chamber operates under the effect of a short circuit, from a closed position according to




a cycle comprising an opening position followed by a closing position.

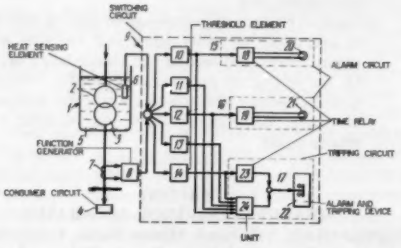
---

**4,148,086**

## DEVICE FOR OVERLOAD PROTECTION OF ELECTRIC APPARATUS

**Mikhail L. Landa, ulitsa Entuziastov, 45, kv. 38; Vladimir Y. Sinelnikov, Pechersky spusk, 13, kv. 24; Rostislav F. Stasenko, ulitsa Tatarskaya, 36/5, kv. 20, and Igor M. Shishkov, ulitsa Tatarskaya, 36/5, kv. 57, all of Kiev, U.S.S.R.**

**Filed Jun. 7, 1977, Ser. No. 804,357**
**Int. Cl.[2] H01H *37/00*; H02H *7/04***
**U.S. Cl. 361—37** **8 Claims**




1. A device for overload protection of an electric apparatus having a winding immersed in a dielectric liquid, comprising:

a heat sensing element immersed in a top portion of said dielectric liquid and producing electric signals corresponding to the temperature of the liquid;

a load current sensor electrically connected to said winding of the apparatus;

a function generator electrically connected to said load current sensor and producing signals indicating overheating of said winding of the apparatus with respect to the temperature of said dielectric liquid, said signals being corrected with due account to changes in the temperature of the hottest spot of said winding caused by the load current;

a switching circuit comprising: low-overload threshold elements which receive signals from said heat sensing element and from said function generator and selectively operate at successively increasing temperature values of the hottest spot of the said winding;

a high-overload threshold element receiving signals from said heat sensing element and said function generator and producing signals corresponding to the critical temperature of the hottest spot of said winding; alarm circuits

responsive to the signals of said low-overload threshold elements; and

a tripping circuit responsive to the signals of said high-overload threshold element and said low-overload threshold element and providing a selective supply of control signals.

---

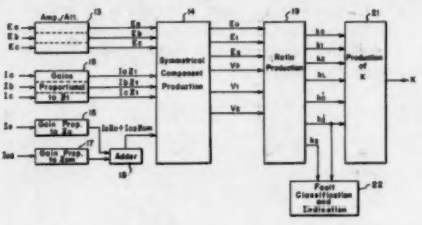
4,148,087

## DISTANCE RELAY FOR ELECTRIC POWER TRANSMISSION LINES

Arun G. Phadke, 15 Eros Ct., Wayne, N.J. 07470

Filed Apr. 20, 1977, Ser. No. 789,342
Int. Cl.[2] H02H *3/26*
U.S. Cl. 361—80 12 Claims

FIG.




1. A distance relay system for a three-phase electric power transmission line which comprises

(a) means responsive to the phase voltages of said three-phase transmission line for producing positive, negative and zero sequence symmetrical component voltages corresponding thereto,

(b) means responsive to respective phase and zero sequence currents of said three-phase transmission line and the positive and zero sequence impedances of the line for producing positive, negative and zero sequence symmetrical component voltage drops,

(c) means for producing predetermined ratios of said positive, negative and zero sequence voltages and substantial changes in said positive, negative and zero sequence voltage drops,

(d) means utilizing said ratios for producing a distance factor corresponding to the ratio of the distance to a fault on said line and the length of the line,

(e) and means for producing a fault signal when said distance factor lies between predetermined fault values.

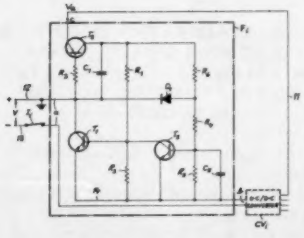
---

4,148,088

## ELECTRONIC CIRCUIT BREAKER

Umberto Meroni, Novate Milanese, Italy, assignor to Societa Italiana Telecomunicazioni Siemens S.p.A., Milan, Italy

Filed Jul. 6, 1977, Ser. No. 813,213
Claims priority, application Italy, Jul. 7, 1976, 25078 A/76
Int. Cl.[2] H02H *3/08*
U.S. Cl. 361—93 9 Claims



1. In a power-supply system for the supply of direct current to a plurality of loads, in combination:

a source of direct current;

a plurality of d-c/d-c converters with input circuits connected in parallel to said source and with output circuits feeding said loads;

a plurality of electronic circuit breakers each inserted between said source and a respective one of said converters; and

a control switch individual to each converter upstream of the respective circuit breaker;

each of said circuit breakers including a switching transistor in series with the input circuit of the associated converter, biasing means for said switching transistor, a feedback connection extending from the output circuit of the associated converter to said biasing means for normally maintaining said switching transistor saturated, trigger means connected to said biasing means and sensitive to an excess current flow in said input circuit for cutting off said switching transistor and open-circuiting the associated converter, and a storage capacitor connected to said biasing means for facilitating a restoration of conductivity of said switching transistor upon a temporary opening of said control switch.

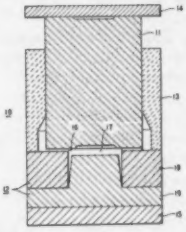
---

4,148,089

## VOLTAGE SURGE PROTECTOR

Becky T. Kerns, Summit; Walter Logan, Somerset; Lee G. McKnight, Morristown; Frederick W. Ostermayer, Jr., Chatham, and Milton E. Terry, Mountainside, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Dec. 22, 1977, Ser. No. 863,465
Int. Cl.[2] H02H *3/22*
U.S. Cl. 361—119 13 Claims

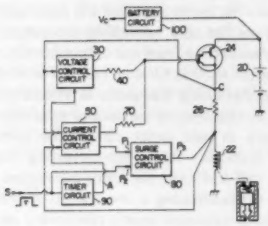


1. An overvoltage surge protector comprising a first electrode, a second electrode and a housing including means for maintaining the first electrode and the second electrode in spaced relationship to one another and electrically insulated from one another, the said electrodes each possessing a broad face and an external contact area, the broad face of said electrodes defining a gap therebetween, the gap so defined including at least a narrow portion and a contiguous wider portion wherein at least the said first electrode possesses a higher electrical resistance from the external contact area to the narrow portion of the gap than its electrical resistance from the external contact area to the wider portion of the gap CHARACTERIZED IN THAT at least the said first electrode consists essentially of a toroid of a predominantly carbonaceous material defining the narrow portion of the gap and a metal post defining the wider portion of the gap, within the central aperture of the toroid.

## 4,148,090
## APPARATUS FOR CONTROLLING AN ELECTROMAGNETIC VALVE

Hisasi Kawai, Toyohashi, and Toshikazu Ina, Okazaki, both of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Filed Feb. 2, 1978, Ser. No. 874,482
Claims priority, application Japan, Feb. 8, 1977, 52-13171
Int. Cl.[2] H01H 47/04
U.S. Cl. 361—152 7 Claims




1. An apparatus for controlling an electromagnetic valve operable during energization of the electromagnetic coil thereof connected in series with a direct current power source through the emitter-collector path of a power transistor comprising:

voltage control means connected to said coil and to the base of said power transistor for controlling the base current of said power transistor in response to changes in the voltage across said coil to thereby maintain a constant value of the voltage across said coil;

current control means connected to said coil and to the base of said power transistor for controlling the base current of said power transistor in response to changes in the electric current flowing through said coil to thereby maintain a constant value of the electric current flowing through said coil;

time control means connected to receive an input pulse signal having a pulse duration which determines energization duration of said coil for sequentially effecting control operations of said voltage control means and said current control means, said time control means effecting the voltage control operation of said voltage control means during a predetermined constant duration synchronized with and shorter than said pulse duration of said input pulse signal and than effecting the current control operation of said current control means during the remaining duration of said input pulse signal; and

surge control means connected to said coil for increasing the electric current flowing from said power transistor to said coil, cooperatively with said current control means, in response to a surge voltage produced by said coil upon the change from said voltage control operation to said current control operation.

---

## 4,148,091
## ELECTROMAGNETIC FORCE MACHINE WITH UNIVERSAL PORTABLE POWER SUPPLY

Karl A. Hansen, and Iver G. Hendrickson, both of Seattle, Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Dec. 27, 1977, Ser. No. 864,735
Int. Cl.[2] H02M 5/40
U.S. Cl. 361—156 12 Claims

1. An electromagnetic force machine comprising:

(a) a single turn flux concentrator including a slow primary winding, a fast primary winding and a single turn secondary work coil;

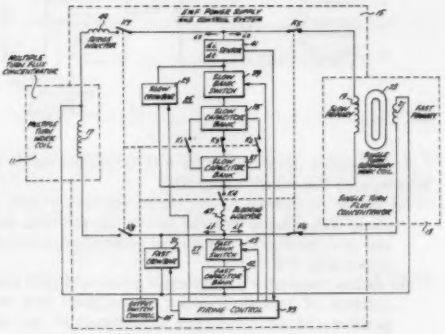
(b) a multiple turn flux concentrator including a multiple turn work coil; and,

(c) a universal power supply for energizing said single and multiple turn flux concentrators, said universal power supply comprising:

(1) a slow current pulse susbsystem for producing a relatively slow rising current pulse, said slow current pulse subsystem including at least first and second slow capacitor banks and a slow bank switch connected to said first and second slow capacitor banks for controlling the initiation of said slowly rising current pulse by said slow capacitor banks;

(2) a fast current pulse subsystem for producing a relatively fast rising current pulse, said fast current pulse subsystem including a fast capacitor bank and a fast bank switch connected to said fast capacitor bank so as to control the initiation of said relatively fast rising current pulse produced by said fast capacitor bank;

(3) shorting means connected to said slow and fast current pulse subsystems for shorting said first and second slow capacitor banks and said fast capacitor bank when enabled by a suitable signal;



(4) switch means connected between said first and second slow capacitor banks for connecting said first and second slow capacitor banks in series or parallel and between said single and multiple turn flux concentrators for selectively applying said relatively slow rising and said relatively fast rising current pulses to said single and multiple turn flux concentrators; and,

(5) a control system for controlling the closure of said slow and fast bank switches such that said slow current pulse subsystem first applies said relatively slow rising pulse to the selected one of said single and multiple turn flux concentrators for a period of time adequate for said slowly rising current pulse to achieve a level equal to about 90% or more of its maximum value and, then, said fast current pulse subsystem applies said relatively fast rising current pulse to said selected one of said single and multiple turn flux concentrators such that the magnetic field produced by said relatively slow rising current pulse rapidly collapses.

---

## 4,148,092
## ELECTRONIC COMBINATION DOOR LOCK WITH DEAD BOLT SENSING MEANS

Ricky Martin, 1851 Pitcairn Dr., Costa Mesa, Calif. 92626

Filed Aug. 4, 1977, Ser. No. 821,733
Int. Cl.[2] E05B 49/00
U.S. Cl. 361—172 17 Claims

1. An electronic combination lock for use with a door including, in combination:

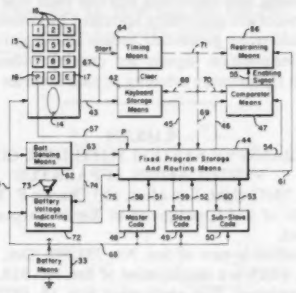
(a) a dead bolt on said door manually operable by an outer turning knob;

(b) an electronic circuit for comparing an input code with a stored code and generating an enabling signal only if said input code is the same as said stored code;

(c) restraining means responsive to said enabling signal to

move from a first position locking said outer turning knob from being manually turned to retract said dead bolt, to a second position releasing said outer turning knob so that said outer turning knob can be manually turned to retract said dead bolt to unlock said door;

(d) bolt position sensing means for sensing a change in the position of said bolt, said restraining means being responsive to said bolt position sensing means to return to said




first position when said bolt is manually extended by said outer turning knob to lock said outer turning knob from being manulaly turned to retract said dead bolt;

(e) battery means for said electronic circuit to provide said enabling signal and operation of said restraining means, manual retraction of said dead bolt avoiding the necessity for expending any battery power to retract said dead bolt whereby less battery drain results than would be the case were the bolt electrically retracted.

---

**4,148,093**

## FLASH ARRAY

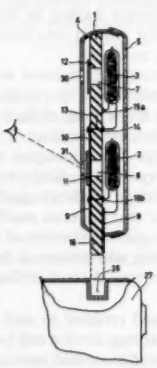
**Jan van Werkhoven, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Jul. 1, 1976, Ser. No. 701,698**

**Claims priority, application Netherlands, Jul. 2, 1975, 7507856**

**Int. Cl.[2] G03B *15/02***

**U.S. Cl. 362—6** **3 Claims**



1. A flash array which comprises: a laminar support, at least a first and a second combustion flash lamp carried on a first side of said support, at least one electric conductive circuit connected to said first and second lamps, a radiation-sensitive visual indicator for indicating whether said first lamp has or has not been flashed, and a housing surrounding at least part of said array, said visual indicator being carried on said support, said support having a hole disposed in aligned relationship with said visual indicator and said first lamp, light emitted by said first lamp causing said visual indicator to indicate flashing, said housing having portions which allow visual access to said indicator, said indicator being also a radiation-sensitive switching contact which is connected to said electric conducting circuit to sequentially flash said first and second lamps.

---

**4,148,094**

## COMBINED SPOT AND SIGNAL LIGHT

**Lester H. Bennett, Los Alamitos, Calif., assignor to Bon Aire Industries, Inc., Signal Hill, Calif.**

**Filed May 2, 1977, Ser. No. 792,895**

**Int. Cl.[2] F21V *33/00***

**U.S. Cl. 362—109** **7 Claims**

1. A combination spotlight and signal light comprising:

a sealed beam spotlight mounted in a housing having a handle, and including spotlight means having a first relatively narrow beam;

switch means for selectively switching said spotlight between an "off" condition, a continuous "on" condition and an intermittent flashing condition; and

at least one signal lens for mounting on said housing, in the path of said narrow beam, said lens being appropriately colored to indicate the desired signal and constructed to disperse said first beam into a second beam of a relatively wide angle when compared to said first relatively narrow beam from said spotlight; and

fastner means for detachably mounting said signal lens on said housing.

---

**4,148,095**

## LENS HOLDING MEANS FOR LIGHT FIXTURES

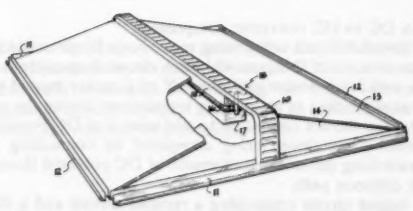
**Gilbert M. Haynen, 216 Academy Rd., Winnipeg, Canada**

**Filed Sep. 19, 1977, Ser. No. 834,287**

**Claims priority, application Canada, Oct. 7, 1976, 262951**

**Int. Cl.[2] F21S *3/00, 3/06;* F21V *21/00***

**U.S. Cl. 362—223** **1 Claim**



1. A ceiling light construction which includes a support member, an elongated lamp fixture secured to said support member and a lens assembly; means to detachably secure said lens assembly to said lamp fixture, said means comprising at least one lens engaging clip secured by one end thereof to a support member and depending downwardly therefrom, clip engaging means on said lens assembly said clip engaging means on said lens assembly comprises a bead formed adjacent the upper edge of said lens assembly and resilient means adjacent the other end of said lens engaging clip detachably engageable under said bead on said lens assembly, said bead and said means

adjacent the other end of said clip co-operating together to detachably secure said lens assembly to said lamp fixture, said means adjacent the other end of said clip comprises at least one projecting portion struck from the material of said clip and extending outwardly therefrom, said projecting portion engaging under said bead, said projecting portion being spaced from said other end whereby said other end consists of a clip moving portion, said other end being angulated outwardly opposite to said projecting portion, said resilient means normally urging said projecting portion into engagement under said bead.

---

**4,148,096**

## LIGHT EMITTER ASSEMBLY

**Steven L. Haas, Marion; Norman O. Fonteneau, and Randall W. Moore, both of Acushnet, all of Mass., assignors to Acushnet Company, New Bedford, Mass.**

**Filed Sep. 12, 1977, Ser. No. 832,562**
**Int. Cl.[2] F21P *1/00***
**U.S. Cl. 362—252** **13 Claims**

1. An apparatus for the generation of light in biomechanical electro-optical systems, said apparatus comprising at least three light emitting diodes affixed to the surface of a curved body, said light emitting diodes emitting light substantially only in the infrared region, said body having an effective radius of curvature of from about $\frac{1}{4}$ inch to about 1 inch, said light emitting diodes being spaced on said curved surface, and at least two of said light emitting diodes being angularly spaced by at least about 120° on said curved surface.

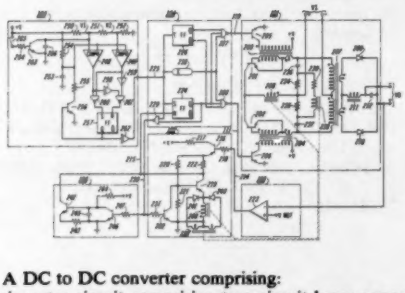
---

**4,148,097**

## DC TO DC CONVERTER UTILIZING CURRENT CONTROL FOR VOLTAGE REGULATION

**Cecil W. Deisch, Wheaton, Ill., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Jul. 1, 1977, Ser. No. 812,318**
**Int. Cl.[2] H02M *3/335, 7/537***
**U.S. Cl. 363—26** **12 Claims**



1. A DC to DC converter comprising:

an inverter circuit comprising two circuit loops connected to a source of DC potential, each circuit loop comprising a switching device and one-half of a center tapped primary winding of an inverter transformer having the center tap thereof connected to said source of DC potential, both circuit loops being completed by connecting the switching devices to said source of DC potential through a common path;

an output circuit comprising a rectifier circuit and a filter circuit connected to a center tapped secondary winding of said inverter transformer such that a DC output voltage is derived;

error signal generating means coupled to monitor said DC output voltage and comprising means for comparing said DC output voltage to a reference voltage and for generating error signals in accordance with the comparisons;

pulse generating means for generating a sequence of periodic pulses;

a current monitoring transformer comprising a primary winding and a secondary winding;

said common path comprising the primary winding of said current monitoring transformer which generates in the secondary winding thereof current signals directly proportional to current flowing in said inverter circuit;

comparing means for directly comparing said current signals to said error signals and for generating pulse termination signals when said current signals exceed a threshold level determined by said error signals; and

control means connected to said pulse generating means, to said comparing means, and to said inverter circuit for controlling said switching devices such that said switching devices are alternately activated by consecutive pulses from said pulse generating means and deactivated by said pulse termination signals for causing pulses of current flow in the primary winding of said inverter transformer.

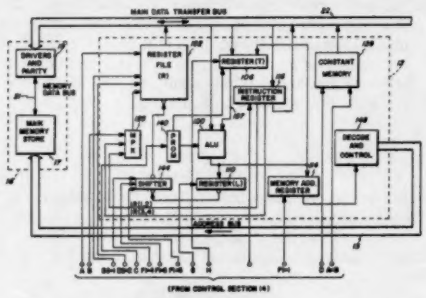
---

**4,148,098**

## DATA TRANSFER SYSTEM WITH DISK COMMAND VERIFICATION APPARATUS

**Edward M. McCreight, Los Altos, and Charles P. Thacker, Palo Alto, both of Calif., assignors to Xerox Corporation, Stamford, Conn.**

**Continuation-in-part of Ser. No. 733,640, Oct. 18, 1976, abandoned, which is a continuation of Ser. No. 518,555, Oct. 29, 1974, abandoned. This application Jun. 15, 1977, Ser. No. 806,781**
**Int. Cl.[2] G06F *11/00*; G05F *13/00***
**U.S. Cl. 364—200** **10 Claims**



1. A data processing system comprising:

a peripheral storage device having at least one recording medium and means for writing data onto and reading data from said recording medium;

a controller coupled to said peripheral storage device and responsive to predetermined instructions and command data for controlling the writing of data onto and reading of data from said recording medium;

a main memory storage device coupled to said controller and having a plurality of addressable storage locations, at least some of said storage locations capable of storing data to be written onto or that has been read from said recording medium, and at least some other of said storage locations capable of storing said command data, said command data including a portion thereof defining a verification word; and

a central processing unit coupled to said controller and to said main memory storage device and including (a) means for supplying said predetermined instructions to said controller, (b) means for addressing the storage locations of said main memory storage device, (c) means for examining said portion of command data accessed from said main memory storage device in order to verify the validity of said accessed command data, said means for examining comprising constant memory means having a predetermined verification word stored therein and means for comparing said portion of said accessed command data with said predetermined verification word, said accessed command data being verified as valid only when the veri-

fication word in said first portion thereof matches said predetermined verification word, and (d) means for supplying to said controller command data verified as valid.

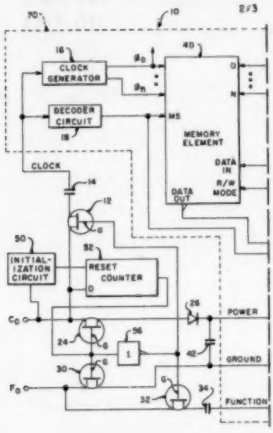
---

**4,148,099**

## MEMORY DEVICE HAVING A MINIMUM NUMBER OF PINS

**Donald K. Lauffer, and William P. Ward, both of Poway, Calif., assignors to NCR Corporation, Dayton, Ohio**

**Filed Apr. 11, 1978, Ser. No. 895,329**
**Int. Cl.[2] G11C *13/00***
**U.S. Cl. 365—226** **16 Claims**




1. A memory device requiring a power signal and a ground level signal, comprising:

a memory element;

at least two external terminals; and

signal processing means for receiving a first signal applied to one of said external terminals and a second signal applied to the other of said external terminals, said first and second signals providing functions other than power and ground signal functions, and for processing said first and second signals to provide said power and ground level signals.

---

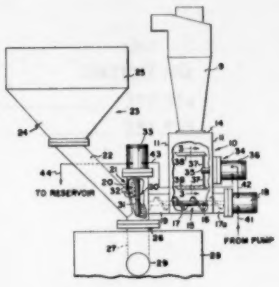
**4,148,100**

## APPARATUS AND METHOD FOR MIXING FLUFFY AND RIGID PLASTICS MATERIALS

**Richard W. Moller, Grand Blanc, Mich., assignor to HydReclaim Corporation, Grand Blanc, Mich.**

**Filed Dec. 15, 1977, Ser. No. 860,838**
**Int. Cl.[2] B01F *7/00, 15/02***
**U.S. Cl. 366—150** **15 Claims**

7. In apparatus for blending fluffy scrap material and fluent rigid base material for subsequent discharge to an extruder or the like and wherein said apparatus comprises an upright mixing chamber having an outlet at its lower end, first conduit means in communication with said chamber at a level above that of said lower end for delivering scrap material into said chamber, and second conduit means in communication with said chamber above the level of said lower end for delivering by gravity base material into said chamber, the improvement




comprising positive drive means in said first conduit means for driving scrap material therethrough into said chamber in such quantity as to restrict the quantity of base material that may enter said chamber; feeding means in said mixing chamber for feeding scrap and base materials downwardly therefrom through said outlet and into an extruder or the like; and means for driving said feeding means.

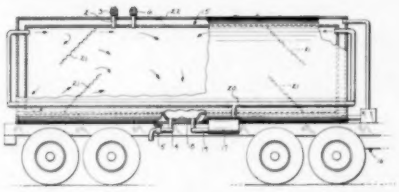
---

**4,148,101**

## HANDLING LATEX PAINT

**Stephen Einhorn, 8049 N. Links Way, Milwaukee, Wis. 53217**

**Filed Feb. 23, 1978, Ser. No. 880,434**
**Int. Cl.[2] B01F *5/12***
**U.S. Cl. 366—262** **9 Claims**



1. The handling of latex paint following the manufacture thereof comprising shipping the same to retail accounts in sealed bulk containers, and stirring the paint substantially constantly during shipment to maintain its uniformity in composition, in viscosity and in temperature.

# DESIGN PATENTS

## GRANTED APR. 3, 1979

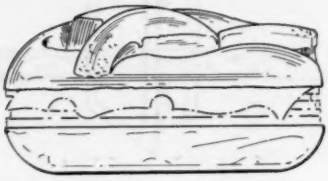
### ERRATA

| For CLASS | See PATENT NO. |
|---|---|
| D21-213 | 251,514 |
| D21-010 | 251,515 |

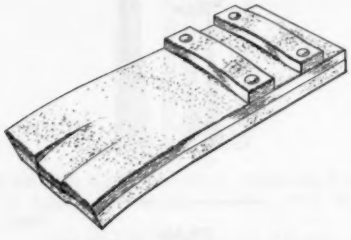
# DESIGNS

APRIL 3, 1979

**251,456**
**SANDWICH ROLL**
John P. Garneau, 2366 NE. 28th St., Lighthouse Point, Fla. 33064
Filed May 25, 1977, Ser. No. 800,334
Term of patent 14 years
Int. Cl. D1—*01*
U.S. Cl. D1—24



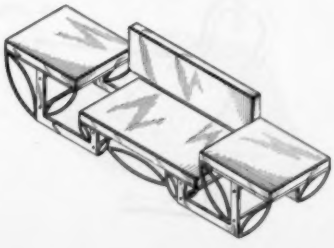
**251,457**
**SPUR PAD**
Albert E. Tatro, P.O. Box 191, Weott, Calif. 95571
Filed Jun. 2, 1977, Ser. No. 802,791
Term of patent 14 years
Int. Cl. D2—*99*
U.S. Cl. D2—27



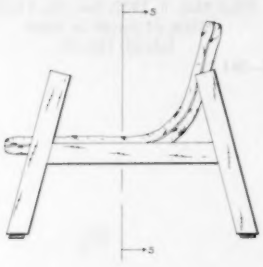
**251,458**
**SLIPPER**
Thomas A. Mertes, P.O. Box 764, Sun Valley, Calif. 91352
Filed May 16, 1977, Ser. No. 796,963
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—279

**251,459**
**HAND PROTECTIVE PAD MEMBER FOR ATHLETIC USE**
James H. Enicks, 1104 S. Eighth St., Leesburg, Fla. 32748
Filed Mar. 8, 1977, Ser. No. 813,823
Term of patent 14 years
Int. Cl. D2—*06*
U.S. Cl. D2—361

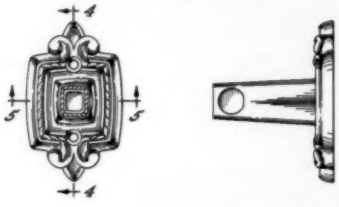
**251,460**
**BENCH OR SIMILAR ARTICLE**
Ramon R. Albert, 1451 Washington Ave., Bronx, New York, N.Y. 10456
Filed Mar. 30, 1977, Ser. No. 782,942
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—59



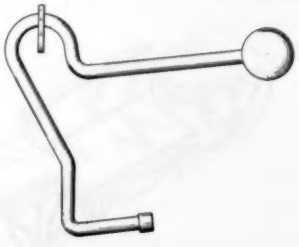
251,461
CHAIR
Steven D. Gageby, 12 Hay Camp Rd., North Oaks, Minn. 55110
Filed Apr. 16, 1976, Ser. No. 677,611
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—67



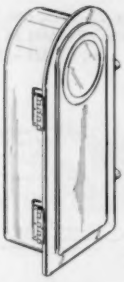
251,462
SUPPORT FOR TOWEL BAR OR THE LIKE
Raymond U. H. Tegner, Lodi, Wis., assignor to Amerock Corporation, Rockford, Ill.
Filed Dec. 1, 1976, Ser. No. 746,609
The portion of the term of this patent subsequent to Oct. 1, 1988, has been disclaimed.
Term of patent 14 years
Int. Cl. D23—*02;* D6—*04*
U.S. Cl. D6—103



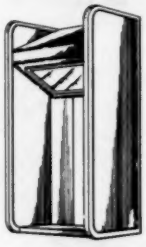
251,463
CLOTHING HOOK FOR CHAIN LINK FENCES
Thomas M. Cangelosi, 85-84 66th Ave., Rego Park, N.Y. 11374
Filed May 26, 1977, Ser. No. 800,961
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D6—122



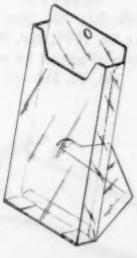
251,464
FIRE EXTINGUISHER STORAGE CABINET
Robert R. Masters, P.O. Box 12945, Houston, Tex. 77017
Filed Jun. 22, 1977, Ser. No. 809,117
Term of patent 14 years
Int. Cl. D29—*01*
U.S. Cl. D6—127



251,465
HOUSING FOR TELEPHONES OR THE LIKE
John D. Margeson, Cumming, Ga., assignor to Phillips & Brooks, Inc., Cumming, Ga.
Filed Jan. 19, 1977, Ser. No. 760,447
Term of patent 14 years
Int. Cl. D6—*04;* D25—*03*
U.S. Cl. D6—132

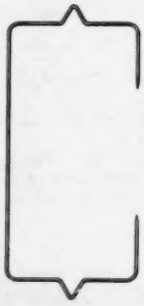


251,466
LITERATURE HOLDER
Philip Ciminelli, Woodcliff Lake, N.J., assignor to Advertising Displays Company, Englewood Cliffs, N.J.
Filed Jun. 10, 1977, Ser. No. 805,555
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D6—140

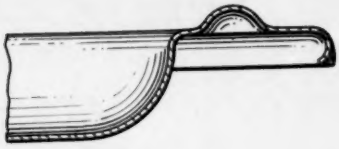


251,467
BOTTOM RAIL OF A VENETIAN BLIND ASSEMBLY
Samuel J. Anderson, Swarthmore, Pa., assignor to International Blind Company, Chester, Pa.
Filed May 27, 1977, Ser. No. 798,680
Term of patent 14 years
Int. Cl. D6—*10*
U.S. Cl. D6—208.1

251,468
HANGER FOR WIGS, TOUPEES, HATS OR THE LIKE
Leona M. Lennemann, 730 24th St. NW., #717, Washington, D.C. 20037
Filed Nov. 30, 1976, Ser. No. 746,125
Term of patent 14 years
Int. Cl. D6—*08*; D8—*08*
U.S. Cl. D6—247



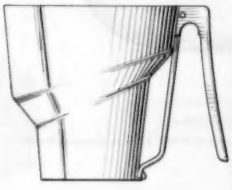
251,469
SERVING TRAY
Inger M. Elliott, and Helena Uglow, both of New York, N.Y., assignors to China Seas, Inc., New York, N.Y.
Filed Feb. 24, 1977, Ser. No. 771,833
Term of patent 14 years
Int. Cl. D7—*99*
U.S. Cl. D7—21



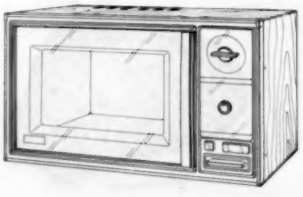
251,470
CUTTING AND SERVING BOARD OR SIMILAR ARTICLE
Robert S. Lutzker, 21 Lee Ave., East Williston, N.Y. 11596
Filed Feb. 17, 1976, Ser. No. 658,397
Term of patent 14 years
Int. Cl. D7—*04*
U.S. Cl. D7—46

251,471
CUTTING AND SERVING BOARD OR SIMILAR ARTICLE
Robert S. Lutzker, 21 Lee Ave., East Williston, N.Y. 11596
Filed Feb. 17, 1976, Ser. No. 658,398
Term of patent 14 years
Int. Cl. D7—*04*
U.S. Cl. D7—46

251,472
SIFTER
Lawrence R. Hutzler, Long Beach, N.Y., and Falle Uldall, Nykøbing, Denmark, assignors to Hutzler Manufacturing Company, Inc., Canaan, Conn.
Continuation of Ser. No. 662,038, Feb. 27, 1976, abandoned. This application Feb. 15, 1978, Ser. No. 877,801
Term of patent 14 years
Int. Cl. D7—*04*
U.S. Cl. D7—47



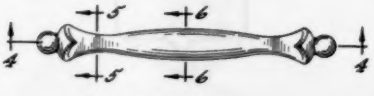
251,473
MICROWAVE OVEN
Yoichi Takahashi, Yamato Kourigama; Toshio Harada, Nara, and Hanji Takahashi, Toyonaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan
Filed Nov. 14, 1977, Ser. No. 851,568
Claims priority, application Japan, May 20, 1977, 52-19579
Term of patent 14 years
Int. Cl. D7—*04*
U.S. Cl. D7—128



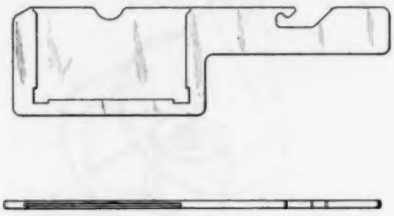
251,474
KNOB
Teresa R. B. Pittenger, Rockford, Ill., assignor to Amerock Corporation, Rockford, Ill.
Filed Mar. 27, 1978, Ser. No. 890,717
Term of patent 14 years
Int. Cl. D8—*06*
U.S. Cl. D8—310

251,475
KNOB
La Verne E. Clayton, Rockford, Ill., assignor to Amerock Corporation, Rockford, Ill.
Continuation-in-part of Ser. No. 890,224, Mar. 27, 1978, abandoned. This application Jun. 19, 1978, Ser. No. 916,780
Term of patent 14 years
Int. Cl. D8—*06*
U.S. Cl. D8—310

251,476
PULL
Raymond U. H. Tegner, Lodi, Wis., assignor to Amerock Corporation, Rockford, Ill.
Filed Mar. 27, 1978, Ser. No. 890,849
Term of patent 14 years
Int. Cl. D8—*06*
U.S. Cl. D8—318

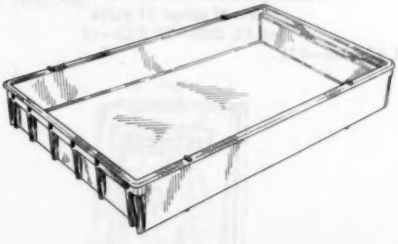


251,477
OUT-INDICATOR FOR HANGING FILING SYSTEM
Norman A. Hedstrom; Robert G. Bogren, both of Worcester, and David M. Wright, Shrewsbury, all of Mass., assignors to Wright Line Inc., Worcester, Mass.
Filed May 23, 1977, Ser. No. 799,754
Term of patent 14 years
Int. Cl. D19—*02*
U.S. Cl. D20—43

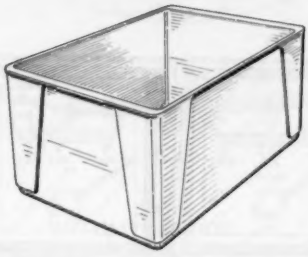


251,478
CORD LOCKING DEVICE
Ogden W. Boden, 1580 Gaywood Dr., Altadena, Calif. 91001
Filed Mar. 7, 1977, Ser. No. 775,162
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—383

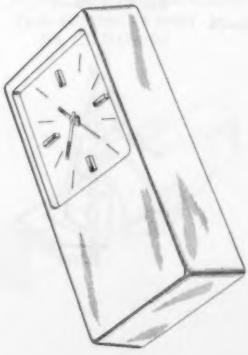
251,479
STACKABLE TRAY
Richard S. Cherry, Don Mills, Canada, assignor to Phillips Plastics of North America, Inc., Toronto, Canada
Filed Feb. 22, 1977, Ser. No. 770,943
Claims priority, application Canada, Sep. 29, 1976, 2909761
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—219



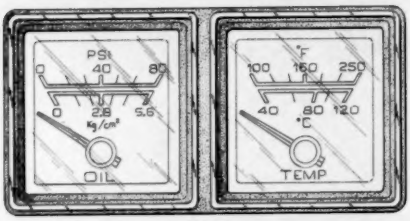
251,480
STORAGE CONTAINER
Richard S. Cherry, Don Mills, Canada, assignor to Phillips Plastics of North America, Inc., Toronto, Canada
Filed Feb. 22, 1977, Ser. No. 770,944
Claims priority, application Canada, Oct. 19, 1976, 1910764
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—219



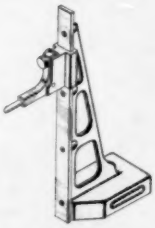
251,481
INGOT CLOCK
René Brasart, Paris, France, assignor to Seiko Time Corporation, New York, N.Y.
Filed Jan. 14, 1977, Ser. No. 759,393
Term of patent 14 years
Int. Cl. D10—*01*
U.S. Cl. D10—25



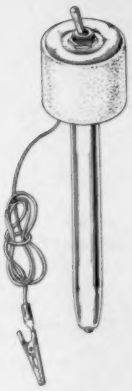
251,482
COMBINED PRESSURE AND TEMPERATURE GAUGE UNIT
Koji Sugiyama, Shizuoka, Japan, assignor to Yazaki Sogyo Kabushiki Kaisha, Tokyo, Japan
Filed Mar. 18, 1977, Ser. No. 779,057
Claims priority, application Japan, Sep. 27, 1976, 51-37827
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—53




251,483
BASE FOR A MEASURING INSTRUMENT
Kenneth A. Freeman, 6622 Bridle Cir., Yorba Linda, Calif. 92686
Filed Jun. 27, 1977, Ser. No. 810,631
Term of patent 14 years
Int. Cl. D10—*07*
U.S. Cl. D10—74



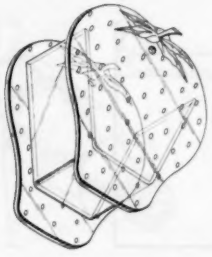
251,484
ELECTRICAL TESTING INSTRUMENT
James L. Howard, Lancaster, S.C., assignor to Earl Cooper Phifer, a part interest
Filed Apr. 8, 1977, Ser. No. 785,930
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—75



251,485
PULSE CODE TRANSMITTER OR SIMILAR ARTICLE
Roy Stockdale, Huntington, N.Y., assignor to Napco Security Systems, Inc., Copiague, N.Y.
Filed Apr. 27, 1977, Ser. No. 791,376
Term of patent 14 years
Int. Cl. D10—*07*; D13—*03*
U.S. Cl. D10—121

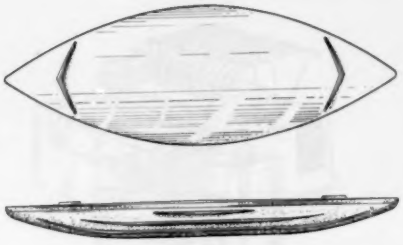
**251,486**
**PLANTER**
Robert S. Lutzker, 21 Lee Ave., East Williston, N.Y. 11596
Filed May 2, 1977, Ser. No. 793,164
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—151

**251,487**
**PLANTER**
Robert S. Lutzker, 21 Lee Ave., East Williston, N.Y. 11596
Filed May 2, 1977, Ser. No. 793,165
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—151

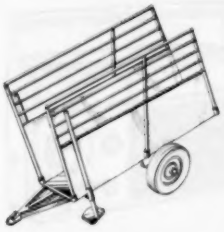


**251,488**
**STATUETTE**
A. Michael Lorenz, 421 55th St., Downers Grove, Ill. 60515
Filed Aug. 22, 1977, Ser. No. 826,670
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—160

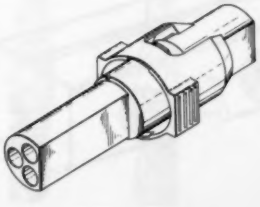
**251,489**
**BOAT**
Nick Mantas, 2630 Sheridan St., Hollywood, Fla. 33020
Filed Jan. 24, 1977, Ser. No. 761,638
Term of patent 14 years
Int. Cl. D12—*06*
U.S. Cl. D12—62



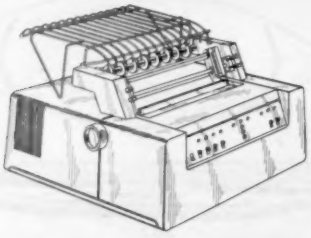
**251,490**
**CATTLE CHUTE**
Joseph W. Cullen, Jr., and Roy L. Cullen, both of Rte. 1, Box 2, Eagle, Id. 83616
Filed Mar. 6, 1974, Ser. No. 448,591
Term of patent 14 years
Int. Cl. D12—*10*
U.S. Cl. D12—105



**251,491**
**ENVIRONMENTALLY SEALED ELECTRICAL CONNECTOR ASSEMBLY**
Clair W. Snyder, Jr., Hellam; Paul B. Derr, Middletown, and Thomas H. Wycheck, Harrisburg, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.
Filed Aug. 26, 1977, Ser. No. 828,060
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D13—24

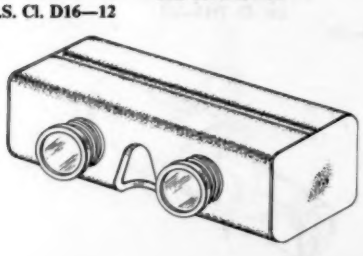


251,492
PRINTER ENCLOSURE
Collan B. Kneale, and Frank Wilkey, Jr., both of Rochester, Minn., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed Apr. 12, 1977, Ser. No. 786,902
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D14—50

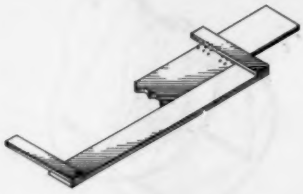


251,493
RADIO RECEIVER
Masanori Hamada, Yao, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan
Filed Mar. 1, 1977, Ser. No. 773,723
Claims priority, application Japan, Sep. 2, 1976, 51-34829
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—70

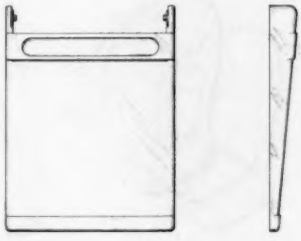
251,494
STEREOSCOPIC VIEWER
Victor Richards, 3838 California St., Suite 612, San Francisco, Calif. 94118, and Charles L. Lawhon, Berkeley, Calif., assignors to Victor Richards, San Francisco, Calif.
Filed Oct. 19, 1977, Ser. No. 843,645
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—12



251,495
GUIDE ASSEMBLY FOR DRAWING MUSICAL STAFF
Saul E. Harrison, 737 Blvd., Westfield, N.J. 07090, and Ira B. Kraemer, 467 Grant Ave., Scotch Plains, N.J. 07076
Filed Apr. 19, 1976, Ser. No. 678,077
Term of patent 14 years
Int. Cl. D19—*06*
U.S. Cl. D19—33

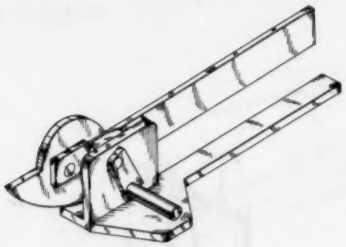


251,496
HOLDER FOR CONTINUOUS SHEET WRITING PAPER
Israel R. Freelander, 6 Spring Valley Dr., Worcester, Mass. 01609
Filed Jul. 5, 1977, Ser. No. 813,217
Term of patent 14 years
Int. Cl. D19—*02*
U.S. Cl. D19—89



251,497
FISHING LURE OR THE LIKE
Carl R. Cordell, Jr., 215 Idlewood Dr., Hot Springs, Ark. 71901
Filed Jul. 15, 1977, Ser. No. 816,150
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—27

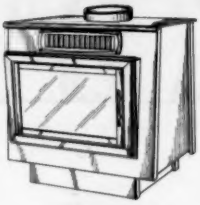
251,498
ADJUSTABLE HOSE CLAMP
George Dick, 1785 Trenton St., Denver, Colo. 80220
Filed Sep. 13, 1976, Ser. No. 722,556
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—19



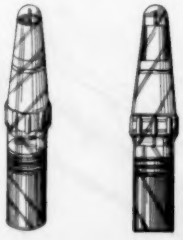
251,499
SPRAY HEAD
Walter B. Warning, Jr., Schaumburg, Ill., assignor to Airprint Systems, Inc., Itasca, Ill.
Filed Oct. 7, 1976, Ser. No. 730,571
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—35

251,500
HEAT RADIATING DEVICE OR SIMILAR ARTICLE
Boyd W. Aigner, 18710 - 82nd NE., Bothell, Wash. 98011
Filed Mar. 14, 1977, Ser. No. 777,758
Term of patent 14 years
Int. Cl. D23—*03*
U.S. Cl. D23—72

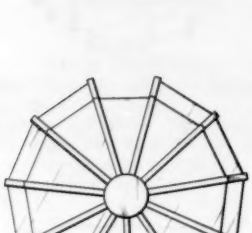
251,501
STOVE FURNACE
Dale A. Peterman, Rte. 1, Box 6015, Sutherlin, Oreg. 97479
Filed Aug. 29, 1977, Ser. No. 828,341
Term of patent 14 years
Int. Cl. D23—*03*
U.S. Cl. D23—97



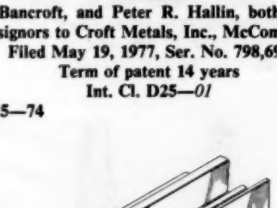
251,502
MEDICANT TRANSFER DEVICE
Mark M. Bridle, Newport Beach, Calif., assignor to American Hospital Supply Corporation, Evanston, Ill.
Filed Jan. 13, 1977, Ser. No. 758,970
Term of patent 14 years
Int. Cl. D24—*04*
U.S. Cl. D24—24



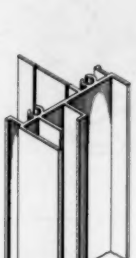
251,503
ENCLOSURE
Roy L. Truitt, Jr., 8034 Purnell, Apt. #308, Austin, Tex. 78767
Filed Nov. 1, 1976, Ser. No. 737,075
Term of patent 14 years
Int. Cl. D25—*03*
U.S. Cl. D25—1



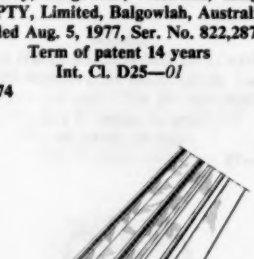
251,504
WINDOW COMPONENT EXTRUSION OR SIMILAR ARTICLE
Joseph C. Bancroft, and Peter R. Hallin, both of McComb, Miss., assignors to Croft Metals, Inc., McComb, Miss.
Filed May 19, 1977, Ser. No. 798,694
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—74



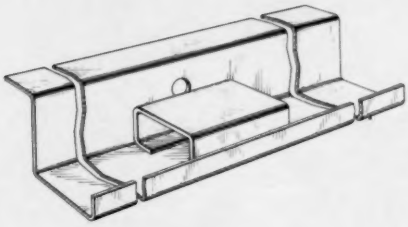
251,505
WINDOW COMPONENT EXTRUSION OR SIMILAR ARTICLE
Joseph C. Bancroft, and Peter R. Hallin, both of McComb, Miss., assignors to Croft Metals, Inc., McComb, Miss.
Filed May 19, 1977, Ser. No. 798,699
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—74



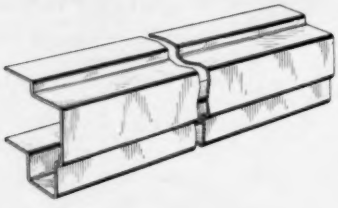
251,506
METAL EXTRUSION
Thorp C. Cowdroy, Balgowlah, Australia, assignor to Clive Investments PTY, Limited, Balgowlah, Australia
Filed Aug. 5, 1977, Ser. No. 822,287
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—74



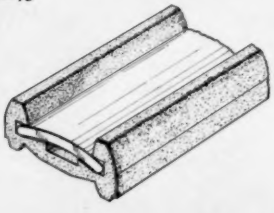
251,507
SUPPORT MEMBER FOR VEHICLE DECKING
Alexander Maricic, Newcastle, Australia, assignor to John Lysaght (Australia) Limited, Sydney, Australia
Filed Apr. 24, 1978, Ser. No. 899,752
Claims priority, application Australia, Oct. 26, 1977, 73180/77
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D25—74



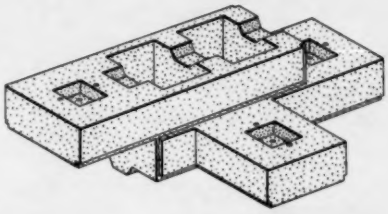
251,508
METAL SECTION
Alexander Maricic, Newcastle, Australia, assignor to John Lysaght (Australia) Limited, Sydney, Australia
Filed Apr. 25, 1978, Ser. No. 899,775
Claims priority, application Australia, Oct. 26, 1977, 73179/77
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—74



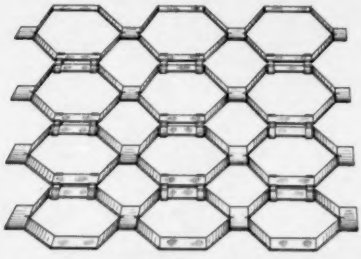
251,509
TRIM STRIP ADAPTED TO BE SECURED TO AN AUTOMOBILE BUMPER OR BODY
Brian A. Wenrick, Dayton, Ohio, assignor to Protective Treatments, Inc., Dayton, Ohio
Filed Dec. 19, 1977, Ser. No. 862,292
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—75



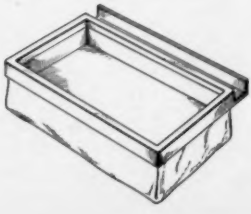
251,510
BUILDING PARTITION BLOCK
James A. Schuring, 352 Saratoga Ave. NW., Canton, Ohio 44708
Filed May 16, 1977, Ser. No. 797,451
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—86



251,511
GRILLE
Edward C. Hallock, Summit, and Gary Steinberg, Cranford, both of N.J., assignors to Construction Specialties, Inc., Cranford, N.J.
Filed Dec. 27, 1977, Ser. No. 864,648
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—91



251,512
NAIL CARE ORGANIZER TRAY OR SIMILAR ARTICLE
Lorraine K. Freeman, 70 E. Walton, Chicago, Ill. 60611
Filed May 27, 1977, Ser. No. 801,158
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—61



**251,513**

**DENTAL FLOSSING TOOL**

John R. Kent, Morrisville, Pa., assignor to Johnson & Johnson, New Brunswick, N.J.

Filed Aug. 15, 1977, Ser. No. 824,879
Term of patent 14 years
Int. Cl. D24—*99*
U.S. Cl. D28—64

**251,514**

**GAME PADDLE**

Lindsey G. Spivey, II, 3614 Oak Grove, Dallas, Tex. 75204, assignor to Jokari/US, Inc., Dallas, Tex.

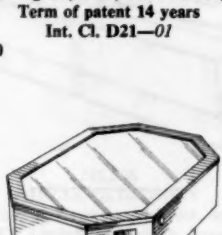
Filed Sep. 27, 1976, Ser. No. 726,743
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D21—213

**251,515**

**COMBINED REFRESHMENT TABLE AND PINBALL MACHINE CASING**

Ian A. Richter, Miami Beach, and David H. Braun, Miami, both of Fla., assignors to Allied Leisure Industries, Inc., Hialeah, Fla.

Filed Aug. 12, 1977, Ser. No. 824,159
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D21—10



# LIST OF PATENTEES

## TO WHOM

## PATENTS WERE ISSUED ON THE 3RD DAY OF APRIL, 1979

NOTE—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. B. Dick Company: *See—*
Colecchi, Paul, 4,147,439, Cl. 400-208.000.
A & B Safe Corporation: *See—*
Bernath, Frank J., 4,147,044, Cl. 70-119.000.
A. J. Gerrard & Company: *See—*
Simich, Emil, 4,147,188, Cl. 140-101.000.
A/S NorMar: *See—*
Eik, Geir, 4,147,330, Cl. 254-173.00R.
A-T-O, Inc.: *See—*
McGill, Robert W.; and Winiasz, Michael E., 4,147,265, Cl. 414-416.000.
AAI Corporation: *See—*
Gore, Bertram W.; LaCosta, Nicholas J.; and Barr, Irwin R., 4,147,108, Cl. 102-67.000.
Schnepfe, Robert W., Jr.; and Lowe, Laban R., Sr., 4,147,216, Cl. 169-70.000.
AB IRO: *See—*
Carlsson, Erik; Pejchal, Karel; Fritzon, Hans G.; Hagstrom, Staffan; Kerff, Anton; and Wide, Lars, 4,147,187, Cl. 139-196.200.
Abe, Masakatsu, to Tokyokikaikakogyo Kabushikikaisha. Method of, and apparatus for, manufacturing coarse-grained bean curd. 4,147,811, Cl. 426-634.000.
ACF Industries, Incorporated: *See—*
Kalsi, Manmohan S., 4,147,183, Cl. 137-625.280.
Moran, George A., 4,147,327, Cl. 251-174.000.
Acushnet Company: *See—*
Haas, Steven L.; Fonteneau, Norman O.; and Moore, Randall W., 4,148,096, Cl. 362-252.000.
Adams, Kenneth D., to Singer Company, The. Combined electronic and mechanical pattern control for a sewing machine. 4,147,118, Cl. 112-158.00E.
Adams, Rodney V.: *See—*
Benbow, Eugene C.; and Adams, Rodney V., 4,147,983, Cl. 324-103.00R.
Adamski, Maximilian, Jr.; Talsma, Robert C.; and Walters, Richard E., to Union Special Corporation. Auxiliary feed mechanism for sewing machines. 4,147,120, Cl. 112-318.000.
Adrian, Renate; von Schenck, Raban; Cox, Bernd; and Wirtz, Peter, to Hoechst Aktiengesellschaft. Production of aluminum polyphosphate. 4,147,758, Cl. 423-315.000.
AEG-Elotherm, GmbH: *See—*
Reinke, Friedhelm; Emde, Friedhelm; Geisel, Herbert; Gies, Rolf; Muller-Axt, Friedrich; Lange, Klaus; and Schoenen, Manfred, 4,147,569, Cl. 148-128.000.
AG Best, Inc.: *See—*
Gilst, Carl V., 4,147,132, Cl. 119-53.000.
Agency of Industrial Science & Technology: *See—*
Ikari, Yoshikatsu; Yokoyama, Shoichiro; Itaya, Ryutaro; and Ohkuma, Tsuneo, 4,147,665, Cl. 252-463.000.
Osumi, Yasuaki; Suzuki, Hiroshi; Kato, Akihiko; Nakane, Masanori; and Miyake, Yoshizo, 4,147,536, Cl. 75-134.00F.
Tomimasu, Takio; and Chiwaki, Mitukuni, 4,147,934, Cl. 250-370.000.
AGFA-Gevaert AG: *See—*
Eickel, Rolf, 4,147,936, Cl. 250-445.00T.
Fauth, Gunter; and Lermann, Peter, 4,147,421, Cl. 354-192.000.
Muller, Jurgen, 4,147,128, Cl. 118-652.000.
AGFA-GEVAERT N.V.: *See—*
De Volder, Noel J.; and Gilliams, Yvan K., 4,147,812, Cl. 427-17.000.
Ahearn, William E.; and Park, Kyu C., to International Business Machines Corporation. Multicolor gas discharge display memory panel. 4,147,958, Cl. 315-169.400.
Aiena, Peter P., to NCR Corporation. Apparatus and method for controlling the velocity of a moveable member. 4,147,967, Cl. 318-341.000.
Aizawa, Tatsuo: *See—*
Miyoshi, Hideo; Shibata, Kiyoshi; Fukuoka, Shogo; and Aizawa, Tatsuo, 4,147,426, Cl. 355-3.0SH.
Ajami, Alfred M.: *See—*
Walsh, Fraser M.; Crouse, Dennis N.; and Ajami, Alfred M., 4,147,840, Cl. 429-50.000.
Ajinomoto Co., Inc.: *See—*
Nagatsu, Toshiharu; and Sakakibara, Shumpei, 4,147,692, Cl. 260-112.50R.
Akae, Kiyoshi; Kitada, Masaya; and Uno, Yoshiyuki, to Unitika Limited. Apparatus for regenerating activated carbon. 4,147,504, Cl. 432-101.000.
Akao, Mutsuo; and Kurechi, Taichi, to Fuji Photo Film Co., Ltd. Packing bag for light-sensitive material. 4,147,291, Cl. 229-55.000.
Akerblom, Ake, to INRECO AB. Control valve, in particular two- or three-way valve for heat exchangers and the like. 4,147,182, Cl. 137-625.170.
Aktiebolaget Electrolux: *See—*
Blomberg, Peter E., 4,147,039, Cl. 62-349.000.
Akzona Incorporated: *See—*
Castro, Anthony J.; and Stoll, James W., 4,147,742, Cl. 260-897.00R.
De Jonge, Cornelis R. H.; and Giezen, Egenius A., 4,147,659, Cl. 252-400.00A.
van der Vies, Johannes, 4,147,783, Cl. 424-243.000.
Albanese, Vincent M., to Nalco Chemical Company. Acid washed montmorillonite clays for improving electrostatic precipitation of dust particles. 4,147,521, Cl. 55-2.000.
Albert, Roosevelt A.: *See—*
Hickmann, Horst R.; and Albert, Roosevelt A., 4,147,167, Cl. 128-303.00R.
Alden Research Foundation: *See—*
Vano, Gerald L., 4,148,075, Cl. 358-267.000.
Alderman, Robert J., to Butler Manufacturing Company. Insulated roof. 4,147,003, Cl. 52-309.800.
Aldrich, Ralph E.; Cumming, William J.; and Simmons, William A., Jr., to Itek Corporation. Mixtures of nematic liquid crystal materials. 4,147,656, Cl. 252-299.000.
Alewelt, Wolfgang; Margotte, Dieter; Vernaleken, Hugo; and Kassahn, Horst-Gunter, to Bayer Aktiengesellschaft. Glass fiber-reinforced polycarbonates with improved mechanical properties containing 0.5 to 5.0% of organopolysiloxane. 4,147,707, Cl. 260-37.0SB.
Alizon, Etienne; and Picquendar, Jean E., to Thomson-CSF. Digital to analog and analog to digital converters using CCD ramp generator. 4,148,016, Cl. 340-347.0DA.
All American Industries, Inc.: *See—*
Mayhew, Harry E.; and De Shay, Harry W., 4,147,317, Cl. 244-116.000.
Allais, Andre; Clemence, Francois; and Deraedt, Roger, to Roussel Uclaf. (4-Phenyl-piperazino alkyl)-3-benzoyl-benzene alkanoates. 4,147,790, Cl. 424-250.000.
Allegheny Ludlum Industries, Inc.: *See—*
Southern, Raymond L.; Benford, James G.; Petarra, Steve; Holbein, Robert D.; and Vince, Albert F., 4,147,506, Cl. 432-148.000.
Allen Organ Company: *See—*
Woron, Robert P.; Whitefield, J. Thomas; and Roth, Steven R., 4,147,083, Cl. 84-1.010.
Allied Chemical Corporation: *See—*
Koff, Fred W.; Tunick, Allen A.; and Sifniades, Stylianos, 4,147,623, Cl. 210-31.00R.
Lipscomb, Walter P.; McKlveen, John R.; and Turner, Garland L., 4,147,749, Cl. 264-167.000.
Allis-Chalmers Corporation: *See—*
Slazas, John J., 4,147,376, Cl. 280-489.000.
Zeiders, Robert H., 4,147,451, Cl. 405-90.000.
Alps Electric Co., Ltd.: *See—*
Ijichi, Sadayoshi; and Shimada, Yasutaka, 4,147,991, Cl. 330-284.000.
Althuis, Thomas H.; Harbert, Charles A.; Johnson, Michael R.; and Melvin, Lawrence S., Jr., to Pfizer Inc. 3-[2-Hydroxy-4-(substituted)-phenyl]azacycloalkanes and derivatives thereof as analgesic agents and intermediates therefor. 4,147,872, Cl. 546-216.000.
Altman, Gerald. Radiation cooling devices and processes. 4,147,040, Cl. 62-467.00R.
Alton Box Board Company: *See—*
Hatfield, Hodge, 4,147,818, Cl. 427-133.000.
Aluminum Company of America: *See—*
Miller, Ronald E., 4,147,531, Cl. 75-44.00S.
Amagami, Keizo: *See—*
Kiuchi, Mitsuyuki; Mizukawa, Takumi; Amagami, Keizo; and Yoshida, Hirokazu, 4,147,910, Cl. 219-10.49R.
Amano, Masahiko: *See—*
Yamawaki, Masao; Aoki, Katsuo; Oka, Yoshio; Suzuki, Takao; Amano, Masahiko; Ozaki, Hideki; and Ishihara, Osamu, 4,147,432, Cl. 118-49.100.
Amengual, Juan: *See—*
Carlsson, Erik; Pejchal, Karel; Fritzon, Hans G.; Hagstrom, Staffan; Kerff, Anton; and Wide, Lars, 4,147,187, Cl. 139-196.200.
Amerace Corporation: *See—*
Heenan, Sidney A.; and Flanagan, Robert M., 4,147,447, Cl. 404-16.000.
American Can Company: *See—*
Middleton, Scott W.; Murray, Lee J., Jr.; and Felstein, Steven R., 4,147,836, Cl. 428-481.000.
American Chain & Cable Company, Inc.: *See—*
Knudsen, Kenneth F., 4,147,110, Cl. 104-172.00S.

American Cyanamid Company: *See—*
Goodman, Richard M., 4,147,627, Cl. 210-58.000.
Hansen, Lloyd F., 4,147,166, Cl. 128-266.000.
Lenhard, Robert H.; and Bernstein, Seymour, 4,147,801, Cl. 424-315.000.
Wang, Samuel S.; Smith, Eugene L., Jr.; and Huliganga, Ernie F., 4,147,644, Cl. 252-61.000.

American Olean Tile Company, Inc.: *See—*
Watson, Wayne C.; and Weisel, Jonas W., 4,147,464, Cl. 408-206.000.

American Optical Corporation: *See—*
Dokus, Edwin A.; and Naylor, Thomas K., 4,147,990, Cl. 330-11.000.

American Precision Industries Inc.: *See—*
Gonas, Edward J.; and Helfritch, Dennis J., 4,147,522, Cl. 55-6.000.

Ames, Victor H.; and Hartelius, Marshall V., to Whiting Corporation. Rail traction vehicle brake system. 4,147,238, Cl. 188-57.000.

AMP Incorporated: *See—*
Andrews, Daniel M.; Merlina, Joseph F.; Redmond, John P.; Scheingold, William S.; and Ulbrich, George, 4,147,889, Cl. 174-52.0FP.
Lill, John F., 4,147,398, Cl. 339-98.000.
Moser, Jessie L.; and Shoemaker, John R., 4,147,399, Cl. 339-99.00R.
Snyder, Clair W., Jr.; Paullus, Clarence L.; and Derr, Paul B., 4,147,400, Cl. 339-217.00S.

Amsted Industries Incorporated: *See—*
Mulcahy, Harry W., 4,147,237, Cl. 188-52.000.

Anderhalt, Donald A.: *See—*
Colburn, Richard H.; Anderhalt, Donald A.; and Stevenson, Robert A., 4,148,003, Cl. 333-181.000.

Anderson, Franklyn G.: *See—*
Wassmer, Norman B.; Anderson, Franklyn G.; and Hodges, Joseph L., 4,147,619, Cl. 209-565.000.

Anderson, Gene S., to Belden Corporation. Fiber optic cable. 4,147,406, Cl. 350-96.230.

Anderson, Richard B.; Hoffmeister, Elaine H.; and Landholm, Richard A., to Eastman Kodak Company. Photographic products and processes employing novel nondiffusible pyridylazonaphthol dye-releasing compounds. 4,147,544, Cl. 96-29.00D.

Ando, Tsuneo; and Nakajima, Hironori, to Howa Sangyo Kabushiki Kaisha. Gas burner ignition device. 4,147,494, Cl. 431-71.000.

Andoh, Shizuo; and Yoshikawa, Kazuo, to Fujitsu Limited. Plasma display panel including shift channels and method of operating same. 4,147,960, Cl. 340-769.000.

Andre, William L.: *See—*
Hudson, Colin M.; and Andre, William L., 4,146,987, Cl. 42-1.00E.

Andrea, Simon, to Sulzer Brothers Limited. Exhaust valve for a reciprocating internal combustion engine. 4,147,149, Cl. 123-188.00S.

Andrews, Daniel M.; Merlina, Joseph F.; Redmond, John P.; Scheingold, William S.; and Ulbrich, George, to AMP Incorporated. Chip carrier. 4,147,889, Cl. 174-52.0FP.

Andrich, Ekkehard; and Schlageter, Klaus, to U.S. Philips Corporation. Method of coating the inner surface of a display window of a television display tube to form a display screen. 4,147,815, Cl. 427-64.000.

Angove, Donald A., to Victory Games, Inc. Pool table croquet game equipment. 4,147,347, Cl. 273-57.000.

Anthony, Richard: *See—*
Kurczak, Walter; and Anthony, Richard, 4,147,248, Cl. 198-358.000.

Aoki, Katsuo: *See—*
Yamawaki, Masao; Aoki, Katsuo; Oka, Yoshio; Suzuki, Takao; Amano, Masahiko; Ozaki, Hideki; and Ishihara, Osamu, 4,147,432, Cl. 118-49.100.

Aoyagi, Masaya; Hayashi, Mikio; Yoshida, Yasuyuki; and Yao, Yoshiaki, to Sumitomo Chemical Company Limited. Implants for bones, joints and tooth roots. 4,146,936, Cl. 3-1.910.

Apfel, Joseph H., to Optical Coating Laboratory, Inc. Laser reflector with reduced electric field intensity. 4,147,409, Cl. 350-164.000.

Appleby, J. Robert; Horvath, Frank P.; and Morris, William J., deceased (by Morris, Charles F., administrator), to Neway Manufacturing, Inc. Machine for finishing valve seats. 4,147,462, Cl. 408-80.000.

Arakawa, Masatoshi; Yamanouchi, Haruo; Okumura, Taro; and Yoshida, Teruo, to Japan Synthetic Rubber Co. Ltd. Process for purification of isoprene. 4,147,848, Cl. 526-77.000.

Aranow, Harold B.; Gyuraki, Joseph P.; and Warenius, Robert E. Foaling alert method and apparatus. 4,147,160, Cl. 128-2.00S.

Arbeithuber, Walter: *See—*
Siebenhofer, Gottfried; Mulner, Manfred; and Arbeithuber, Walter, 4,147,391, Cl. 299-75.000.

Ardac, Inc.: *See—*
Gorgone, Robert L.; Iannadrea, Gerald; and Kovach, Alan J., 4,147,430, Cl. 356-51.000.

Aritomi, Mitsutoshi, to Mitsubishi Petrochemical Company Limited. Oil-modified alkyd resin compositions. 4,147,675, Cl. 260-22.0CB.

Armour Pharmaceutical Company: *See—*
Kozischek, James F., 4,147,766, Cl. 424-14.000.

Armstrong Cork Company: *See—*
Heckles, John S.; and Miller, Norman L., 4,147,686, Cl. 260-31.80R.

Arnau, Jose L.; Barrat, Christian R.; and Wevers, Jean, to Procter & Gamble Company, The. Liquid detergent composition. 4,147,649, Cl. 252-89.00R.

Arnesen, Tore O. Thermo-vacuum structure. 4,146,996, Cl. 52-2.000.

Arnold, Fred E.; and Hedberg, Frederick L., to United States of America, Air Force. Acetylene-substituted aromatic benzils and acetylene-terminated quinoxaline compositions. 4,147,868, Cl. 544-353.000.

Arp, Robert A.: *See—*
Miller, Curtis H.; Kaldun, Mark R.; and Arp, Robert A., 4,147,969, Cl. 320-2.000.

Artemiev, Lev N.; and Kurilkin, Vitaly V. Fast reactor recharging device. 4,147,588, Cl. 176-30.000.

Arthur D. Little, Inc.: *See—*
Lee, D. William; O'Brien, John L.; and Rossetti, Michael, 4,147,639, Cl. 252-25.000.
Modell, Michael, 4,147,624, Cl. 210-32.000.

Artiano, Adrian; Halgrimson, Darrell H.; and Joselovitz, Henry W., to Black Clawson Inc. Method and apparatus for sorting contaminant material from processing material. 4,147,620, Cl. 209-590.000.

ASA S.A.: *See—*
Bourgeois, Norbert P., 4,147,042, Cl. 66-231.000.

Asada, Chiaki: *See—*
Yajima, Seishi; Kayano, Hideo; Asada, Chiaki; and Saito, Makoto, 4,147,538, Cl. 75-229.000.

Asculai, Samuel S.; Kupferberg, Alfred B., deceased (by Kupferberg, Beatrice, coexecutor); and Halpern, coexecutor, by Meyer, to Ortho Pharmaceutical Corp. Nonionic surface active anti-viral agents. 4,147,803, Cl. 424-320.000.

ASEA AB: *See—*
Kain, Per; Lockley, Robert; and Valis, Jaroslav, 4,147,966, Cl. 318-327.000.

Ashmead, Albert S.: *See—*
Corbo, Kenneth P.; Shepard, Richard W.; Ross, William A.; and Ashmead, Albert S., 4,147,570, Cl. 148-144.000.

Athey, Stuart E.: *See—*
Fraula, Louis F.; and Athey, Stuart E., 4,147,558, Cl. 134-10.000.
Fraula, Louis F.; and Athey, Stuart E., 4,147,559, Cl. 134-57.00D.

Atlantic Richfield Company: *See—*
Sheng, Ming N.; and Kao, Jar-Lin, 4,147,884, Cl. 562-533.000.

Atlas Copco AB: *See—*
Lewkowicz, Josef; and Larsson, Torsten O., 4,147,234, Cl. 184-6.260.

Au, Andrew T.: *See—*
Baldwin, Jack E.; and Au, Andrew T., 4,147,699, Cl. 260-306.70C.

Audi-Nsu Auto Union Aktiengesellschaft Neckarsulm: *See—*
Heck, Klaus, 4,147,335, Cl. 266-261.000.

Automators, Inc.: *See—*
Zimmerman, Clifton E., 4,147,485, Cl. 425-144.000.

Avco Corporation: *See—*
Moellmann, Heinz F., 4,147,024, Cl. 60-39.150.
Wester, Douglas J.; and Martin, Robert D., 4,147,061, Cl. 73-341.000.

Azuma, Hideo: *See—*
Kaji, Kunio; Azuma, Hideo; and Iwade, Kunio, 4,147,260, Cl. 414-98.000.

B. F. Goodrich Company, The: *See—*
Davis, Ronald J.; and Boyer, Thomas W., 4,147,859, Cl. 528-496.000.
Skillicorn, Douglas E., 4,147,854, Cl. 526-312.000.

Baba, Kousaku: *See—*
Okabayashi, Shigeru; Baba, Kousaku; and Endo, Hiroshi, 4,148,007, Cl. 340-52.00F.

Babinsky, Andrew D.; and Hora, Charles J., to Diamond Shamrock Corporation. Reverse-side treatment of fabric reinforced membranes. 4,147,844, Cl. 521-27.000.

Baboian, Robert; and Haynes, Gardner S., to Texas Instruments Incorporated. Method and apparatus for monitoring the effectiveness of corrosion inhibition of coolant fluid. 4,147,596, Cl. 204-1.00T.

Bacciarelli, Sergio: *See—*
Bornengo, Mario; and Bacciarelli, Sergio, 4,147,697, Cl. 546-258.000.

Bai, Yasuo; Yanagi, Hideki; Yoshikawa, Junichi; and Ogino, Shigeo, to Sumitomo Chemical Company Limited. Purification of urokinase. 4,147,592, Cl. 195-66.00B.

Baid, Waheed G.: *See—*
Browne, Arthur; and Baid, Waheed G., 4,147,930, Cl. 250-223.00R.

Bailey, Bruce K., heir: *See—*
Bailey, Kenneth M., deceased; Raymond, Alyce B., heir; Bailey, Bruce K., heir; McElreath, Kay E. B., heir; and Wood, Marsha L. B., heir, 4,147,360, Cl. 273-261.000.

Bailey, Bruce Kenneth: *See—*
Bailey, Kenneth M., deceased; Raymond, Alyce B., heir; Bailey, Bruce K., heir; McElreath, Kay E. B., heir; and Wood, Marsha L. B., heir, 4,147,360, Cl. 273-261.000.

Bailey, Kenneth M., deceased; by Raymond, Alyce B., heir; by Bailey, Bruce K., heir; by McElreath, Kay E. B., heir; and by Wood, Marsha L. B., heir, to McElreath, Kay Etma Bailey; Wood, Marsha Lou Bailey; Bailey, Bruce Kenneth; and Raymond, Alyce Bailey. Four-sided chess game. 4,147,360, Cl. 273-261.000.

Bailey, Morris W.; Luby, John J.; and Carlton, Donald G., to Overhead Door Corporation. Fire door and operator therefor. 4,147,197, Cl. 160-7.000.

Baker, Clifford A.; and Harrison, Norwood L., to Humes Limited. Pipe seal. 4,147,368, Cl. 277-182.000.

Baker, William H. Perimeter skimming gutter with fluid level-responsive weir closure for weir skimming flow control. 4,146,937, Cl. 4-172.170.

Balcar, Cestmir; Kostka, Antonin; Havranek, Jaroslav; and Lalak, Marcel, to Vyskumny ustav papieru a celulosy of Bratislava. Apparatus for deinking printed wastepapers. 4,147,616, Cl. 209-12.000.

Baldwin, Jack E.; and Au, Andrew T., to Massachusetts Institute of Technology. α-Lactam precursors of penicillin and cephalosporin antibiotics. 4,147,699, Cl. 260-306.70C.

Balinth, Ivan J., to Johnson & Johnson. Pressure-sensitive adhesive compositions. 4,147,831, Cl. 428-356.000.
Balistrieri, Peter A. Paddle ball game. 4,147,354, Cl. 273-97.00R.
Bando, Yoshichika: *See*—
Iwase, Keizo; Takada, Toshio; and Bando, Yoshichika, 4,147,747, Cl. 264-65.000.
Bangert, Hans; and Waterkamp, Peter, to O&K Orenstein & Koppel Aktiengesellschaft. Central articulation for a self-propelling, articulated vehicle. 4,147,375, Cl. 280-483.000.
Bar, Gerd: *See*—
Dautel, Helmut; Fritz, Mathias; and Bar, Gerd, 4,147,261, Cl. 414-557.000.
Barakitis, Nikolaos: *See*—
Webb, Edward A.; Makar, Francis B., Jr.; and Barakitis, Nikolaos, 4,147,952, Cl. 313-220.000.
Barberi, Maryhannah S. Educational toy. 4,146,977, Cl. 35-77.000.
Bard, Donald O., to Vought Corporation. Means and method for uncaging a gyroscope rotor. 4,147,066, Cl. 74-5.100.
Bargain, Michel; and Lefort, Marcel, to Rhone-Poulenc Industries. Ethylenic silicon compounds and thermoplastic elastomers obtained therefrom. 4,147,711, Cl. 260-448.20N.
Barie, Walter P., Jr.: *See*—
Sabourin, Edward T.; and Barie, Walter P., Jr., 4,147,856, Cl. 528-92.000.
Barlow, Gordon A.; Licitis, Gunars; and Wildman, John R., to Marvin Glass & Associates. Target shooting apparatus. 4,147,355, Cl. 273-101.100.
Barr, Irwin R.: *See*—
Gore, Bertram W.; LaCosta, Nicholas J.; and Barr, Irwin R., 4,147,108, Cl. 102-67.000.
Barrat, Christian R.: *See*—
Arnau, Jose L.; Barrat, Christian R.; and Wevers, Jean, 4,147,649, Cl. 252-89.00R.
Barry, Robert L. Device for use in threading needles. 4,147,411, Cl. 350-240.000.
Bartel, William J.; Cha, Chang Y.; and Burton, Robert S., III, to Occidental Oil Shale, Inc. Method for establishing a combustion zone in an in situ oil shale retort. 4,147,389, Cl. 299-2.000.
Bartlett, Philip L., to Du Pont de Nemours, E. I., and Company. Process for solvent-drying leather. 4,147,511, Cl. 8-94.180.
BASF Aktiengesellschaft: *See*—
Baumann, Hans; and Oberlinner, Andreas, 4,147,509, Cl. 8-18.00R.
Kincel, Roger S., 4,147,315, Cl. 242-192.000.
Kuesters, Werner; Heil, Guenter; Fischer, Martin; Eisert, Manfred; and Kast, Hellmut, 4,147,604, Cl. 204-159.230.
BASF Wyandotte Corporation: *See*—
Chung, Rack H., 4,147,716, Cl. 260-465.00D.
Basiulis, Algerd, to Hughes Aircraft Company. Semi-active temperature control for heat pipe heat recovery units. 4,147,206, Cl. 165-32.000.
Bastet, Evert J.: *See*—
Fogh, Hans M.; and Bastet, Evert J., 4,147,121, Cl. 114-204.000.
Bata, George T.; and Spiker, Van P., to Bendix Corporation, The. Vacuum actuated automatic temperature control system with actuator pressure signal feedback. 4,147,205, Cl. 165-26.000.
Bateman, Robert F.; and Boucher, Richard A., to Dart Industries Inc. Serving dish. 4,147,277, Cl. 220-400.000.
Bates, Claude F., III; and Olson, Duane R. Collapsible hand carrier. 4,147,286, Cl. 224-48.00D.
Bathelt, Heinrich; Billenstein, Siegfried; and Schuierer, Erich, to Hoechst Aktiengesellschaft. Ampholytic, fluorine-containing esters of phosphorous acid. 4,147,743, Cl. 260-924.000.
Baues, Peter; Mahlein, Hans; Moeckel, Peter; Reichelt, Achim; and Winzer, Gerhard, to Siemens Aktiengesellschaft. Movable probe carrying optical waveguides with electro-optic or magneto-optic material for measuring electric or magnetic fields. 4,147,979, Cl. 324-244.000.
Baugh, Daniel W., Jr.: *See*—
Fiske, Tom R.; and Baugh, Daniel W., Jr., 4,147,733, Cl. 260-653.400.
Baumann, Hans; and Oberlinner, Andreas, to BASF Aktiengesellschaft. Pressure-sensitive recording material. 4,147,509, Cl. 8-18.00R.
Baump, Paul A.; Lyu, Don; Sain, Jerry T.; and Zbriger, Richard A., to Greer Hydraulics, Inc. Access control system. 4,148,012, Cl. 340-149.00A.
Bavelsky, David M.: *See*—
Bufalov, Gimn V.; Sarantsev, Kir B.; Bogoradovsky, Gennady I.; Titensky, Vladimir I.; Stolyarov, Alexei V.; Bavelsky, David M.; and Burdin, Alexandr A., 4,147,473, Cl. 417-53.000.
Baxter Travenol Laboratories, Inc.: *See*—
Jess, Thurman S., 4,147,184, Cl. 137-625.470.
Bayer Aktiengesellschaft: *See*—
Alewelt, Wolfgang; Margotte, Dieter; Vernaleken, Hugo; and Kassahn, Horst-Gunter, 4,147,707, Cl. 260-37.0SB.
Dieterich, Dieter, 4,147,653, Cl. 252-182.000.
Harnisch, Horst; and Brack, Alfred, 4,147,865, Cl. 544-142.000.
Hetzel, Hartmut; Konig, Klaus; Schmelzer, Hans G.; and Wagner, Kuno, 4,147,714, Cl. 260-453.0AB.
Knofel, Hartmut; and Ellendt, Gunther, 4,147,724, Cl. 260-570.00D.
Konig, Hans-Bodo; Metzger, Karl G.; Preiss, Michael; and Schrock, Wilfried, 4,147,693, Cl. 424-246.000.
La Spina, Andrea; Dietrich, Werner; and Schliebs, Reinhard, 4,147,710, Cl. 260-429.900.
Meiser, Werner; Buchel, Karl H.; Kramer, Wolfgang; and Grewe, Ferdinand, 4,147,791, Cl. 424-269.000.
Reischl, Artur; Jabs, Gert; and Gonzalez-Dorner, Alberto C., 4,147,680, Cl. 260-29.2TN.
Roos, Ernst, 4,147,722, Cl. 260-543.00H.
Bayer, Bryce E.: *See*—
Dillon, Peter L. P.; and Bayer, Bryce E., 4,148,059, Cl. 358-37.000.
Bayley, Brian J.: *See*—
Davidson, Howard R.; and Bayley, Brian J., 4,147,294, Cl. 233-26.000.
Baylis, Eric K.: *See*—
Dingwall, John G.; Baylis, Eric K.; and Campbell, Colin D., 4,147,780, Cl. 424-211.000.
BBC Brown, Boveri & Company Limited: *See*—
Pfenninger, Hans, 4,147,204, Cl. 165-4.000.
Zboril, Josef, 4,147,466, Cl. 415-174.000.
Beck & Co. AG.: *See*—
Janssen, Harald, 4,147,817, Cl. 427-118.000.
Becker, Willi, to Heidelberger Druckmaschinen AG. Protective device for a perfector printing press. 4,147,105, Cl. 101-230.000.
Beckman Instruments, Inc.: *See*—
Bonn, Theodore H., 4,147,959, Cl. 340-779.000.
Davidson, Howard R.; and Bayley, Brian J., 4,147,294, Cl. 233-26.000.
Oh, Chan S., 4,147,651, Cl. 252-299.000.
Becton, Dickinson and Company: *See*—
Bennett, Michael C.; and Mehta, Suresh N., 4,147,628, Cl. 210-83.000.
Beddall, Edward A.: *See*—
Chen, Evan N.; Beddall, Edward A.; and Goddard, Bryan J., 4,146,958, Cl. 30-47.000.
Bedford Engineering Corporation: *See*—
Richardson, Carl; and Wiley, Philip A., 4,147,618, Cl. 209-589.000.
Bednarczyk, Edward J. Fishing rod tip-up. 4,146,988, Cl. 43-17.000.
Beecham Group Limited: *See*—
Wootton, Gordon, 4,147,796, Cl. 424-273.00R.
Beem, Leo D.: *See*—
Beem, Lewis W.; and Beem, Leo D., 4,147,576, Cl. 156-94.000.
Beem, Lewis W.; and Beem, Leo D. Method of repairing a vehicle body. 4,147,576, Cl. 156-94.000.
Behney, Charles A. Method of performing implantations in a canine ear or the like for correctional purposes. 4,147,164, Cl. 128-76.00R.
Belden Corporation: *See*—
Anderson, Gene S., 4,147,406, Cl. 350-96.230.
Belinkoff, Irving R., to Kidde Consumer Durables Corp. Percolator partition plate heater assembly. 4,147,925, Cl. 219-530.000.
Bell Telephone Laboratories, Incorporated: *See*—
Deisch, Cecil W., 4,148,097, Cl. 363-26.000.
Dworak, Francis S., 4,147,902, Cl. 179-175.20R.
Eichenbaum, Bernard R.; and Gardner, William B., 4,147,407, Cl. 350-96.340.
Kerns, Becky T.; Logan, Walter; McKnight, Lee G.; Ostermayer, Frederick W., Jr.; and Terry, Milton E., 4,148,089, Cl. 361-119.000.
Shroff, Jayant R., 4,147,841, Cl. 429-86.000.
Bellapast GmbH: *See*—
Thiel, Alfons W.; and Hell, Hans, 4,147,492, Cl. 425-394.000.
Belyaev, Valentin M.: *See*—
Gokhberg, Pavel Y.; Gorbunov, Boris N.; Khardin, Alexandr P.; Rudkovsky, Vladimir L.; Belyaev, Valentin M.; Lukashov, Anatoly I.; Shpantseva, Ljudmila V.; and Orlyansky, Vitaly V., 4,147,736, Cl. 260-681.000.
Benbow, Eugene C.; and Adams, Rodney V., to Westinghouse Electric Corp. Remote meter reading maximum KW demand meter. 4,147,983, Cl. 324-103.00R.
Bendix Autolite Corporation: *See*—
Bienkowski, Joseph V.; Romime, Donald J.; and Davis, Donald C., 4,147,513, Cl. 23-232.00E.
Bendix Corporation, The: *See*—
Bata, George T.; and Spiker, Van P., 4,147,205, Cl. 165-26.000.
Kluger, Michael A., 4,147,239, Cl. 188-79.5GC.
Preniczny, Robert B.; and Han, Benjamin C. P., 4,147,241, Cl. 188-264.00G.
Benford, James G.: *See*—
Southern, Raymond L.; Benford, James G.; Petarra, Steve; Holbein, Robert D.; and Vince, Albert F., 4,147,506, Cl. 432-148.000.
Benjamin, Louis: *See*—
Walser, Armin; Fryer, Rodney I.; and Benjamin, Louis, 4,147,875, Cl. 548-302.000.
Bennes Marrel: *See*—
Corompt, Antoine, 4,147,266, Cl. 414-480.000.
Bennett, Allan I.: *See*—
Kuhn, Edmund W.; and Bennett, Allan I., 4,148,024, Cl. 340-638.000.
Bennett, Lester H., to Bon Aire Industries, Inc. Combined spot and signal light. 4,148,094, Cl. 362-109.000.
Bennett, Michael C.; and Mehta, Suresh N., to Becton, Dickinson and Company. Novel apparatus and method. 4,147,628, Cl. 210-83.000.
Bennett, Robert B., to Dow Chemical Company, The. Method for the insulation of a tank. 4,146,952, Cl. 29-452.000.
Bennett, Robert S. Foam producing apparatus. 4,147,306, Cl. 239-327.000.
Berges, David A., to SmithKline Corporation. 7-Acylamino-3-(1-carboxymethylthioethyltetrazolyl-5-thiomethyl)-3-cephem-4-carboxylic acids. 4,147,701, Cl. 260-308.00D.
Bergische Stahl-Industrie: *See*—
Klein, Willi; and Rocholl, Henning, 4,147,240, Cl. 188-218.0XL.

Berkowitz, Sidney, to FMC Corporation. Process for preparing aliphatic diperoxydicarboxylic acids. 4,147,720, Cl. 260-502.00R.
Berman, Mark Y.: *See*—
Worrell, J. Robert; and Berman, Mark Y., 4,147,036, Cl. 405-205.000.
Bernath, Frank J., to A & B Safe Corporation. Safe door locking arrangement. 4,147,044, Cl. 70-119.000.
Bernstein, Seymour: *See*—
Lenhard, Robert H.; and Bernstein, Seymour, 4,147,801, Cl. 424-315.000.
Bernzomatic Corporation: *See*—
Stenner, Irving H.; and Nelson, John M., 4,147,272, Cl. 220-89.00B.
Bertaccini, Gianpaolo, to Snamprogetti S.p.A. Adjustable apparatus for supporting a pipeline laid on deep waters and for impressing thereto a preselected geometrical configuration. 4,147,455, Cl. 405-172.000.
Beschke, Helmut; and Friedrich, Heinz, to Deutsche Gold- und Silber Scheideanstalt vormals Roessler. Process for the production of pyridine and 3-methyl pyridine. 4,147,874, Cl. 546-251.000.
Bespak Industries Limited: *See*—
Warren, William E., 4,147,476, Cl. 417-328.000.
Beydler, William W.; and Helland, Arden R., to Westinghouse Electric Corp. MOS Interface circuit. 4,147,940, Cl. 307-205.000.
Beyer, Norman H.: *See*—
Brandon, Thomas A., Jr.; and Beyer, Norman H., 4,147,270, Cl. 220-22.000.
Bickel, Hans: *See*—
Woodward, Robert B.; and Bickel, Hans, 4,147,864, Cl. 544-16.000.
BICOSA Societe de Recherches: *See*—
Courier de Mere, Henri E. F. M., 4,147,499, Cl. 431-255.000.
Biedebach, Lawrence W. Pot hanger. 4,147,320, Cl. 248-318.000.
Bienkowski, Joseph V.; Romime, Donald J.; and Davis, Donald C., to Bendix Autolite Corporation. Method and apparatus for measuring the $O_2$ content of a gas. 4,147,513, Cl. 23-232.00E.
Biet, Jean-Pierre H.: *See*—
Edlinger, Wolfgang F. J.; De Brebisson, Michel; Biet, Jean-Pierre H.; and Decrouen, Jean-Michel, 4,148,055, Cl. 357-44.000.
Bigelow, John W. Press. 4,147,102, Cl. 100-257.000.
Billenstein, Siegfried: *See*—
Bathelt, Heinrich; Billenstein, Siegfried; and Schuierer, Erich, 4,147,743, Cl. 260-924.000.
Bilodeau, William N.: *See*—
Singer, Arnold J.; Lover, Myron J.; Rhodes, William E., III; Bilodeau, William N.; and Lynch, Donald M., 4,147,800, Cl. 424-312.000.
Bindicator Company: *See*—
Levine, Walter E., 4,147,906, Cl. 200-61.200.
Biotest-Serum-Institut GmbH: *See*—
Stephan, Wolfgang; and Kotitschke, Ronald, 4,147,765, Cl. 424-12.000.
Bird Electronic Corporation: *See*—
Lesyk, Leo, 4,147,207, Cl. 165-106.000.
Birdus, Rostislav G.: *See*—
Gorodissky, Leonid G.; Evtikhovich, Stanislav M.; Grigoriev, Igor P.; Kvashnin, Nikolai A.; Sokolov, Vladislav I.; Chekreneva, Larisa S.; Birdus, Rostislav G.; Zaitseva, Maria A.; Kryazhev, Jury T.; Kuzminova, Galina V.; and Romanov, Nikolai T., deceased, 4,147,366, Cl. 277-22.000.
Bishop, Thomas D., to Deritend Engineering Company Limited, The. Treatment of web material. 4,147,078, Cl. 83-74.000.
Black Clawson Inc.: *See*—
Artiano, Adrian; Halgrimson, Darrell H.; and Joselovitz, Henry W., 4,147,620, Cl. 209-590.000.
Black, William L.: *See*—
Wood, Stanley E.; Moore, Kenneth L.; and Black, William L., 4,147,055, Cl. 73-167.000.
Blaha, Franklyn C.: *See*—
Cricchi, James R.; Blaha, Franklyn C.; and Fitzpatrick, Michael D., 4,148,049, Cl. 357-23.000.
Blattler, Joe F., to International Tool and Supply Co. Inc. Heavy duty mobile pipe straightening machine of relatively light-weight construction. 4,147,046, Cl. 72-68.000.
Blaupunkt-Werke GmbH: *See*—
Bragas, Peter, 4,148,077, Cl. 360-10.000.
Blessum, Norman S.: *See*—
Ragle, Herbert U.; and Blessum, Norman S., 4,148,080, Cl. 360-51.000.
Block Drug Company, Inc.: *See*—
Singer, Arnold J.; Lover, Myron J.; Rhodes, William E., III; Bilodeau, William N.; and Lynch, Donald M., 4,147,800, Cl. 424-312.000.
Blomberg, Peter E., to Aktiebolaget Electrolux. Assembly and control system for manufacturing and separating ice cubes. 4,147,039, Cl. 62-349.000.
Bloomquist, Arnold E.: *See*—
Lim, Sim Koei; Bloomquist, Arnold E.; and Schaper, Raymond J., 4,147,681, Cl. 260-29.6TA.
Blount, David H. Process for the production of halohydrin reaction products utilizing cyanide silicate compounds. 4,147,713, Cl. 260-448.80R.
Blumenfeld, Georg; Petersen, Egon N.; Richtzenhain, Hermann; Vogt, Wilhelm; and Vollkommer, Norbert, to Dynamit Nobel Aktiengesellschaft. Tetrabromoxylylene diacrylates and substituted acrylates. 4,147,881, Cl. 560-221.000.
Blyton, Benjamin G. Railroad crossing and process for fabrication thereof. 4,147,304, Cl. 238-8.000.
Bobrick, Samuel M. Spring clip for jewelry band. 4,147,285, Cl. 224-177.000.
Bock, Jan: *See*—
Lundberg, Robert D.; Makowski, Henry S.; and Bock, Jan, 4,147,677, Cl. 260-23.50A.
Bodenseewerk Perkin-Elmer & Co., GmbH: *See*—
Huber, Bernhard, 4,147,434, Cl. 356-312.000.
Body, Alexander S., to D.A.B. Industries, Inc. Method for making friction bands. 4,147,914, Cl. 219-86.900.
Boeing Commercial Airplane Company: *See*—
Gaunt, Frank L.; Hill, Horace E.; and Soderberg, Mark S., 4,147,232, Cl. 184-1.00E.
Boeing Company, The: *See*—
Hansen, Karl A.; and Hendrickson, Iver G., 4,148,091, Cl. 361-156.000.
Lunden, Clarence D., 4,148,039, Cl. 343-872.000.
Lunden, Clarence D.; and Buehler, Walter E., 4,148,040, Cl. 343-708.000.
Rohner, Martin J.; Olszewsky, George; and Hamilton, Harry W., 4,146,967, Cl. 33-174.00C.
van der Velden, Johannes H., 4,147,385, Cl. 285-382.400.
Boelens, Harmannus; and Wobben, Hendrik J., to Naarden International, N.V. Perfume compositions containing 8 allyl-8-hydroxytricyclo [5,2,1,$0^{2,6}$] decane alone or combined with O-hydroxybenzyl ethyl ether. 4,147,671, Cl. 252-522.000.
Bogoradovsky, Gennady I.: *See*—
Bufalov, Gimn V.; Sarantsev, Kir B.; Bogoradovsky, Gennady I.; Titensky, Vladimir I.; Stolyarov, Alexei V.; Bavelsky, David M.; and Burdin, Alexandr A., 4,147,473, Cl. 417-53.000.
Bollinger, Joseph M.: *See*—
Machleder, Warren H.; and Bollinger, Joseph M., 4,147,641, Cl. 252-51.50A.
Bolza-Schunemann, Hans B., to Koenig & Bauer Aktiengesellschaft. Sheet transfer apparatus. 4,147,337, Cl. 270-19.000.
Bom, Cornelis J. G.: *See*—
van der Lely, Ary; and Bom, Cornelis J. G., 4,147,117, Cl. 111-52.000.
Bon Aire Industries, Inc.: *See*—
Bennett, Lester H., 4,148,094, Cl. 362-109.000.
Bond, Robert, to Dunlop Limited. Testing of materials with stress waves. 4,147,064, Cl. 73-596.000.
Bonheim, Hans: *See*—
Levine, Jack W.; and Bonheim, Hans, 4,146,966, Cl. 33-24.00B.
Bonn, Theodore H., to Beckman Instruments, Inc. Display section for multilayer gas-discharge display panel. 4,147,959, Cl. 340-779.000.
Book, Walter R.; and Putetti, Anthony M., to Textron, Inc. Drawing heavy walled parts. 4,147,049, Cl. 72-349.000.
Borg-Warner Corporation: *See*—
Woollard, Gary A.; and Smirl, Richard L., 4,147,068, Cl. 74-230.17E.
Borman, Willem F. H., to General Electric Company. Process for the solid state polymerization of branched poly(alkylene terephthalates) using aromatic polycarbonates. 4,147,738, Cl. 260-860.000.
Bornengo, Mario; and Bacciarelli, Sergio, to Montedison S.p.A. Quaternarization of dipyridyl acetate to N,N'-dimethyl-4,4'-dipyridylium dihalide in acetic acid. 4,147,697, Cl. 546-258.000.
Borner, William G.; Dill, Aloys J.; and Fisher, Gordon L., to International Nickel Company, Inc., The. Method for producing electrolytic nickel in particulate forms under condition of high and variable internal stress. 4,147,597, Cl. 204-12.000.
Bornstein, Michael; and Cise, Michael D., to Eli Lilly and Company. Method of preparing a rapidly dissolving powder of sterile crystalline cefazolin sodium for parenteral administration. 4,146,971, Cl. 34-5.000.
Bosselaar, Cornelis A.; and Foster, Alan, to U.S. Philips Corporation. Thyristor containing channel stopper. 4,148,053, Cl. 357-38.000.
Bostock, Stephen B.; Renfrew, Andrew H. M.; and Cartwright, Geoffrey H., to Imperial Chemical Industries Limited. Coloration process. 4,147,510, Cl. 8-39.00C.
Boucher, Richard A.: *See*—
Bateman, Robert F.; and Boucher, Richard A., 4,147,277, Cl. 220-400.000.
Bourgeois, Norbert P., to ASA S.A. Selection mechanism of circular knitting-machine. 4,147,042, Cl. 66-231.000.
Bouyoucos, John V., to Hydroacoustics Inc. Methods and apparatus for the generation and transmission of seismic signals. 4,147,228, Cl. 181-119.000.
Bower, Gerald S.; Peters, Rex B.; and Morris, Harold D., to Systron-Donner Corporation. Two axis gas damped angular velocity sensor. 4,147,063, Cl. 73-504.000.
Boyan, Gerard E., to Perkin-Elmer Corporation, The. Scan cameras. 4,147,419, Cl. 354-66.000.
Boyer, Thomas W.: *See*—
Davis, Ronald J.; and Boyer, Thomas W., 4,147,859, Cl. 528-496.000.
Bozzelli, John W.; and Dennis, Kent S., to Dow Chemical Company, The. High molecular weight polymers of phenylmaleic anhydride. 4,147,852, Cl. 526-272.000.
Braak, Dirk J., to Tekade Felten & Guilleaume Fernmeldeanlagen GmbH. Circuit arrangement for mutually decoupled connecting of plural transmitters. 4,148,038, Cl. 343-858.000.
Brack, Alfred: *See*—
Harnisch, Horst; and Brack, Alfred, 4,147,865, Cl. 544-142.000.
Bradley, Robert A. Process for liquefaction of natural gas. 4,147,525, Cl. 62-23.000.
Bragas, Peter, to Blaupunkt-Werke GmbH. Method of playing back

video records through television receiver operating at a different line standard. 4,148,077, Cl. 360-10.000.

Brandell, John R. Golf swing practice device. 4,147,356, Cl. 273-183.00B.

Brandon, Thomas A., Jr.; and Beyer, Norman H., to Chrysler Corporation. Master cylinder reservoir. 4,147,270, Cl. 220-22.000.

Brannegan, Daniel P.: *See*—
Brennan, Thomas M.; Brannegan, Daniel P.; Weeks, Paul D.; and Kuhla, Donald E., 4,147,705, Cl. 260-345.90R.

Breidt, Peter, Jr.; Higgins, Thomas W.; Nahmias, A. Michael; and Weiner, Milton L., to Mobil Oil Corporation. Coextruded heat sealable laminar thermoplastic films. 4,147,827, Cl. 428-218.000.

Brennan, Thomas M.; Brannegan, Daniel P.; Weeks, Paul D.; and Kuhla, Donald E., to Pfizer Inc. Preparation of gamma-pyrones. 4,147,705, Cl. 260-345.90R.

Brenner, Gerhard: *See*—
Wurscher, Horst; and Brenner, Gerhard, 4,147,341, Cl. 271-122.000.

Breslow, Jeffrey D., to Marvin Glass & Associates. Amusement device for spelling education. 4,146,978, Cl. 35-77.000.

Brewerton, David: *See*—
Sizmur, Malcolm F.; Brewerton, David; and Mason, Brian W., 4,147,993, Cl. 331-1.00A.

Bridgestone Tire Company Limited: *See*—
Kobayashi, Norio; and Fukamachi, Yoshihiro, 4,147,577, Cl. 156-123.00R.

Bridwell, John W.; and Myers, Jimmy D., to Caterpillar Tractor Co. Shaft locking apparatus. 4,147,442, Cl. 403-4.000.

Brinkley, Max D.: *See*—
Olsen, Richard J.; Brinkley, Max D.; and Thiele, John R., 4,147,482, Cl. 425-46.000.

Briskin, Alan S.: *See*—
Royce, Elliott F.; Royce, Jeff L.; Briskin, Alan S.; and Ogland, James W., 4,146,948, Cl. 27-2.000.

Bristol-Myers Company: *See*—
Geria, Navin; and Shaleesh, George, 4,147,750, Cl. 264-255.000.

British Federal Welder & Machine Co. Limited: *See*—
Clews, John C.; and Goodwin, Austin G., 4,147,913, Cl. 219-97.000.

British Nuclear Fuels Ltd.: *See*—
Milburn, George; and Chetter, John, 4,147,489, Cl. 425-355.000.
Stewart, Roy, 4,147,490, Cl. 425-355.000.

Britt, Robert E. Adjustable thresholds and methods of making and using the same. 4,146,995, Cl. 49-468.000.

Britten, David P., to Marconi Company Limited, The. Retracting mechanism for antenna ground plane radials. 4,148,037, Cl. 343-846.000.

Brock, Michael; and Cooke, Brian A., to Imperial Chemical Industries Limited. Phosphating process. 4,147,567, Cl. 148-6.15Z.

Brolde, Kurt, to Endress & Hauser GmbH & Co. Non-linear direct-current amplifier for measuring purposes. 4,147,989, Cl. 328-142.000.

Brollo, Giuseppe. Apparatus for producing insulating panels. 4,147,582, Cl. 156-462.000.

Brook, Richard L.; Gaske, Joseph E.; Kearney, Thomas E.; and Wydeen, Russell D., to DeSoto, Inc. Supply package for wet-impregnated multifilament roving. 4,147,253, Cl. 206-205.000.

Brooks, John D.; Humason, Harry W.; and Gordon, Frank E., to United States of America, Navy. Apparatus for launching stores from a submerged vehicle. 4,147,124, Cl. 114-321.000.

Brooks, Joseph F.; and Elderton, Robert W., to National Union Electric Corporation. Insulated fan for electric appliance. 4,147,470, Cl. 416-95.000.

Brown, Douglas H.; Cross, Ronald J.; and MacNicol, David D., to National Research Development Corporation. Separation of organic compounds from mixtures by clathration. 4,147,735, Cl. 260-674.0WC.

Browne, Arthur; and Baid, Waheed G., to U.S. Philips Corporation. Object location detector. 4,147,930, Cl. 250-223.00R.

Bruce, Jeffrey S., to Stagehand Associates. Free-standing carrying case for musical instrument. 4,147,254, Cl. 206-314.000.

Bruzaholms Maskiner AB: *See*—
Nilsson, Uno B., 4,147,259, Cl. 414-745.000.

Bsesonuzny Nauchno-Issledovatelsky i Experimentalny Institut po Perabotke Khimicheskikh Volokon: *See*—
Gorodissky, Leonid G.; Evtikhovich, Stanislav M.; Grigoriev, Igor P.; Kvashnin, Nikolai A.; Sokolov, Vladislav I.; Chekreneva, Larisa S.; Birdus, Rostislav G.; Zaitseva, Maria A.; Kryazhev, Jury T.; Kuzminova, Galina V.; and Romanov, Nikolai T., deceased, 4,147,366, Cl. 277-22.000.

Buchel, Karl H.: *See*—
Meiser, Werner; Buchel, Karl H.; Kramer, Wolfgang; and Grewe, Ferdinand, 4,147,791, Cl. 424-269.000.

Buchwald, Alexander: *See*—
Schwartz, Stephen H.; and Buchwald, Alexander, 4,147,775, Cl. 424-150.000.

Buck Stove Marketing, Corporation: *See*—
Buckner, Carrol E., 4,147,153, Cl. 126-63.000.

Buckner, Carrol E., to Buck Stove Marketing, Corporation. Fireplace air circulation and draft control. 4,147,153, Cl. 126-63.000.

Budd Company, The: *See*—
Jahnle, Herbert A., 4,147,486, Cl. 425-157.000.

Budzich, Tadeusz. Load responsive valve assemblies. 4,147,178, Cl. 137-596.100.

Buehler, Walter E.: *See*—
Lunden, Clarence D.; and Buehler, Walter E., 4,148,040, Cl. 343-708.000.

Buell, Kenneth B., to Procter & Gamble Company, The. Method of bonding a porous fibrous web to a substrate. 4,147,580, Cl. 156-291.000.

Buelow, Fred K.; Zasio, John J.; and Cooke, Laurence H., to Fujitsu Limited. Electron beam exposure system method and apparatus. 4,147,937, Cl. 250-492.00A.

Bufalov, Gimn V.; Sarantsev, Kir B.; Bogoradovsky, Gennady I.; Titensky, Vladimir I.; Stolyarov, Alexei V.; Bavelsky, David M.; and Burdin, Alexandr A. Method of regulating multistage axial compressor output and an axial compressor for carrying same into effect. 4,147,473, Cl. 417-53.000.

Bulloch, Andrew C.: *See*—
Hayes, Norman J.; and Bulloch, Andrew C., 4,147,168, Cl. 128-330.000.

Bunda, Tsuchio: *See*—
Noguchi, Masaaki; Bunda, Tsuchio; and Tanaka, Taro, 4,147,136, Cl. 123-3.000.

Bunker Ramo Corporation: *See*—
Patten, Hudson T.; and Woodcock, Floyd B., 4,147,222, Cl. 175-9.000.

Bunting, William M.: *See*—
Langer, Arthur W., Jr.; and Bunting, William M., 4,147,530, Cl. 75-0.50A.

Burdin, Alexandr A.: *See*—
Bufalov, Gimn V.; Sarantsev, Kir B.; Bogoradovsky, Gennady I.; Titensky, Vladimir I.; Stolyarov, Alexei V.; Bavelsky, David M.; and Burdin, Alexandr A., 4,147,473, Cl. 417-53.000.

Burkert GmbH: *See*—
Dettmann, Heinrich; and Uhl, Ernst, 4,147,824, Cl. 428-65.000.

Burkhardt, Gisbert, to Licentia Patent-Verwaltungs-G.m.b.H. Conveyor with pusher fingers. 4,147,252, Cl. 198-732.000.

Burndy Corporation: *See*—
Frank, Walter J., Jr., 4,147,446, Cl. 403-390.000.

Burns & Russell Company of Baltimore, The: *See*—
Rich, Russell P., 4,147,690, Cl. 260-45.70R.

Burroughs Corporation: *See*—
Garrison, Lilburn H.; and Dixit, Anant D., 4,147,584, Cl. 156-612.000.
Gyi, Ko Ko, 4,148,084, Cl. 360-98.000.
Ragle, Herbert U.; and Blessum, Norman S., 4,148,080, Cl. 360-51.000.

Burson, David C., to Texas Instruments Incorporated. System with joystick to control velocity vector of a display cursor. 4,148,014, Cl. 340-709.000.

Burton, Robert S., III: *See*—
Bartel, William J.; Cha, Chang Y.; and Burton, Robert S., III, 4,147,389, Cl. 299-2.000.

Buten, Alan Morris: *See*—
McDonald, Angus, 4,147,318, Cl. 180-64.00R.

Butler Manufacturing Company: *See*—
Alderman, Robert J., 4,147,003, Cl. 52-309.800.

Butler, Neal R.: *See*—
Chiang, Alice M.; and Butler, Neal R., 4,147,562, Cl. 136-213.000.

Butts, Homer F. Double stream stacker and jogger. 4,147,340, Cl. 271-218.000.

Bystrov, Nikolai M.; Simonov, Anatoly N.; Levin, Alexandr B.; Meshkov, Jury K.; Zakharov, Anatoly A.; and Kolbanev, Alexei V. Glass sheet molding assembly. 4,147,527, Cl. 65-183.000.

C. Evans & Sons Limited: *See*—
Gostling, Peter E., 4,147,321, Cl. 248-354.00R.

C. van der Lely N.V.: *See*—
van der Lely, Ary; and Bom, Cornelis J. G., 4,147,117, Cl. 111-52.000.

Cain, George R.; Gidick, Ward F.; and Edgar, William D., to Koppers Company, Inc. One-spot cylindrical coke quenching car and quenching method. 4,147,594, Cl. 201-39.000.

Calder, Alan; and Herd, Alan J., to Imperial Chemical Industries Limited. Smoking mixtures. 4,147,172, Cl. 131-2.000.

Calgon Corporation: *See*—
Lim, Sim Koei; Bloomquist, Arnold E.; and Schaper, Raymond J., 4,147,681, Cl. 260-29.6TA.

Calton, Gary J.; Espenshade, Marlin A.; and Ranieri, Richard L., to W. R. Grace & Co. Antineoplastic agent. 4,147,798, Cl. 424-279.000.

Cambridge Thermionic Corporation: *See*—
Lyman, Joseph, 4,147,396, Cl. 308-10.000.

Cameron, John K., to Kenney Manufacturing Company. Drapery support combination. 4,147,199, Cl. 160-330.000.

Campbell, Colin D.: *See*—
Dingwall, John G.; Baylis, Eric K.; and Campbell, Colin D., 4,147,780, Cl. 424-211.000.

Campbell, Gerald A.; and Kelley, Richard N., to Eastman Kodak Company. Photographic silver halide element with a layer of sulfonated polymer. 4,147,550, Cl. 96-87.00A.

Canadian Patents and Development Limited: *See*—
Struble, Dean L.; and Swailes, G. Edward, 4,147,771, Cl. 424-84.000.

Cannon, Thomas B.; and O'Neill, John F., to Storage Technology Corporation. Fixed speech buffer memories for signalling without an order wire. 4,147,896, Cl. 179-15.0AS.

Canoga Controls Corporation: *See*—
Jordan, William D., Jr., 4,147,276, Cl. 220-323.000.

Canon Kabushiki Kaisha: *See*—
Goshima, Yoshitomo; Onoda, Shigeyoshi; Kawakubo, Kazuo; Hoshino, Osamu; Tsunoi, Haruo; and Iida, Noriyoshi, 4,147,501, Cl. 432-60.000.

Cappo, Gerald R., to Dow Corning Corporation. Capacitor containing

a naphthoxy substituted dimethylsiloxane dielectric fluid. 4,147,646, Cl. 252-63.700.

Caraher, James R.; Rappoport, William M.; DeCou, Donald F.; and Deits, William C., to Machlett Laboratories, Inc., The. Image tube with conditioned input screen. 4,147,950, Cl. 313-181.000.

Carborundum Company, The: *See*—
Harting, Louis L.; and Kozlow, Michael R., 4,147,186, Cl. 138-155.000.

Cargill, Incorporated: *See*—
Kellor, Richard L., 4,147,810, Cl. 426-629.000.

Carl Freudenberg, Firma: *See*—
Heckel, Klaus; Klaffke, Friedemann; and Umann, Walter, 4,147,828, Cl. 428-255.000.

Carl Krasny & Associates, Inc.: *See*—
Kaplan, Irving L., 4,147,258, Cl. 414-680.000.

Carlin, William W., to PPG Industries, Inc. Electrolytic production of hydrobromic acid. 4,147,601, Cl. 204-103.000.

Carlsson, Erik; Pejchal, Karel; Fritzon, Hans G.; Hagstrom, Staffan; Kerff, Anton; and Wide, Lars, to AB IRO; and Amengual, Juan. Shuttle. 4,147,187, Cl. 139-196.200.

Carlton, Donald G.: *See*—
Bailey, Morris W.; Luby, John J.; and Carlton, Donald G., 4,147,197, Cl. 160-7.000.

Carpenter, Michael P.; and D'Amico, Paul M., to Telex Communications, Inc. Microphone with channel selector and push-to-talk button interlock. 4,147,904, Cl. 179-178.000.

Carrier Corporation: *See*—
Harvey, Samuel E.; Whitehead, James S.; and Goranson, Paul L., 4,147,264, Cl. 414-411.000.
Slade, Owen G., 4,147,125, Cl. 115-14.000.

Cartwright, Geoffrey H.: *See*—
Bostock, Stephen B.; Renfrew, Andrew H. M.; and Cartwright, Geoffrey H., 4,147,510, Cl. 8-39.00C.

Casey, James P., to Microfibres, Inc. Method of making a splinter-flocked fabric from a multifilament tow. 4,147,813, Cl. 427-27.000.

Castro, Anthony J.; and Stoll, James W., to Akzona Incorporated. Solid antistatic compositions. 4,147,742, Cl. 260-897.00R.

Caswell, Richard L., to Dresser Industries, Inc. Breather vent for vapor vent valve. 4,147,096, Cl. 98-122.000.

Caterpillar Tractor Co.: *See*—
Bridwell, John W.; and Myers, Jimmy D., 4,147,442, Cl. 403-4.000.
Engel, William K.; and Hansen, Robert C., 4,147,092, Cl. 91-490.000.
Johnson, Howard L., 4,147,034, Cl. 60-422.000.
Nieman, John R., 4,147,837, Cl. 428-548.000.
Stedman, Robert N., 4,147,218, Cl. 172-803.000.

Caudel, Edward R.; Wilson, William R.; and Merrow, Thomas E., to Texas Instruments Incorporated. Dual digital processor transceiver. 4,147,984, Cl. 325-25.000.

Centre d'Exploitation et de Recherche Industrielle d'Application de Brevets (CERIAB): *See*—
Chardonneau, Joel; and Sable, Claude, 4,147,477, Cl. 417-343.000.

Ceraver: *See*—
Demit, Joel, 4,147,759, Cl. 423-327.000.

Cha, Chang Y.: *See*—
Bartel, William J.; Cha, Chang Y.; and Burton, Robert S., III, 4,147,389, Cl. 299-2.000.

Chaires, George O. Surveyor's rod. 4,146,969, Cl. 33-295.000.

Challenge Machinery Company, The: *See*—
Westra, Dan P.; and Siewert, John, 4,146,942, Cl. 11-1.00B.

Chaman, Elena S.: *See*—
Golovchinskaya, Elena S.; Chernov, Vladimir A.; Chaman, Elena S.; Nikolaeva, Ljudmila A.; and Korsunsky, Vyacheslav S., 4,147,867, Cl. 544-244.000.

Champion Associated Weavers Limited: *See*—
Newton, Eric W.; and Scott, Geoffrey, 4,147,103, Cl. 101-115.000.

Chang, Wen-Hsuan: *See*—
Scriven, Roger L.; and Chang, Wen-Hsuan, 4,147,679, Cl. 260-29.2TN.

Chantler, Douglas A.; and Coleman, Ross W. Ladder stabilizing device. 4,147,231, Cl. 182-172.000.

Chardonneau, Joel; and Sable, Claude, to Centre d'Exploitation et de Recherche Industrielle d'Application de Brevets (CERIAB). Pumping apparatus particularly for oil wells. 4,147,477, Cl. 417-343.000.

Charles, Herbert N., to Fram Corporation. Automotive cooling fan with biased flexible blades. 4,147,471, Cl. 416-132.00A.

Chekreneva, Larisa S.: *See*—
Gorodissky, Leonid G.; Evtikhovich, Stanislav M.; Grigoriev, Igor P.; Kvashnin, Nikolai A.; Sokolov, Vladislav I.; Chekreneva, Larisa S.; Birdus, Rostislav G.; Zaitseva, Maria A.; Kryazhev, Jury T.; Kuzminova, Galina V.; and Romanov, Nikolai T., deceased, 4,147,366, Cl. 277-22.000.

Chemed Corporation: *See*—
Sabatelli, Philip M.; and Daugherty, Denny E., 4,147,650, Cl. 252-103.000.

Chemetal Corporation: *See*—
Holzl, Robert A., 4,147,820, Cl. 427-248.00C.

Chemplex Company: *See*—
Liu, Joseph; Grimmett, Howard L.; and Hwang, Yu-Tang, 4,147,849, Cl. 526-96.000.

Chen, Evan N.; Beddall, Edward A.; and Goddard, Bryan J., to Warner-Lambert Company. Safety razor. 4,146,958, Cl. 30-47.000.

Chernoff, Ralph C.: *See*—
Fletcher, James C.; Tausworthe, Robert C.; and Chernoff, Ralph C., 4,148,031, Cl. 343-100.0TD.

Chernov, Vladimir A.: *See*—
Golovchinskaya, Elena S.; Chernov, Vladimir A.; Chaman, Elena S.; Nikolaeva, Ljudmila A.; and Korsunsky, Vyacheslav S., 4,147,867, Cl. 544-244.000.

Chernyshev, Boris A.: *See*—
Pronko, Vladimir G.; Onosovsky, Evgeny V.; Chuvpilo, Albert V.; Zhuravleva, Irina N.; Korneev, Viktor A.; Klimenkov, Dmitry A.; Smirnova, Galina M.; Usanov, Vladimir V.; Ivanov, Jury I.; Chernyshev, Boris A.; Nikitkin, Vasily D.; Nikolaev, Anatoly F.; Trizno, Maya S.; Karkozov, Valery G.; Verkhoglyadova, Tatyana J.; Moskalev, Evgeny V.; and Yakovleva, Lidia I., 4,147,210, Cl. 165-165.000.

Chetter, John: *See*—
Milburn, George; and Chetter, John, 4,147,489, Cl. 425-355.000.

Chevallier, Jacques P.; Guarnieri, Charles R.; Onton, Aare; and Wieder, Harold, to International Business Machines Corporation. Photoconductor for GaAs laser addressed devices. 4,147,667, Cl. 252-501.000.

Chiang, Alice M.; and Butler, Neal R., to Honeywell Inc. Pyroelectric detector. 4,147,562, Cl. 136-213.000.

Chiang, Chao-Kuo: *See*—
Montgomery, Rex; and Chiang, Chao-Kuo, 4,147,691, Cl. 260-112.00R.

Chicago Lock Co.: *See*—
Scherbing, Frank J., 4,147,905, Cl. 200-44.000.

Chicago Pneumatic Tool Company: *See*—
Wallace, William K., 4,147,219, Cl. 173-12.000.

Chieh-Tsung, Chang, to Chieh-Tsung, Chang. Multi-layered solar energy collector. 4,147,158, Cl. 126-271.000.

Chiklis, Charles K., to Polaroid Corporation. Conductive compositions and coating compositions for making the same. 4,147,668, Cl. 252-503.000.

Chiocchio, Louis R.: *See*—
Dever, Gerald V., Jr.; and Chiocchio, Louis R., 4,147,746, Cl. 264-39.000.

Chiron, Georges, to Saint-Gobain Industries. High frequency apparatus for forming structural shapes. 4,147,488, Cl. 425-174.80E.

Chiwaki, Mitukuni: *See*—
Tomimasu, Takio; and Chiwaki, Mitukuni, 4,147,934, Cl. 250-370.000.

Chiyoda Chemical Engineering & Construction Co., Ltd.: *See*—
Endo, Tomizo; Sumida, Yutaka; Kawahara, Toru; Ohtake, Masaichi; Motokawa, Shoichi; Nagayama, Keiji; Shigeta, Masatomo; Hozuma, Hiroshi; Tomizawa, Masaharu; and Kikuchi, Hideo, 4,147,753, Cl. 422-202.000.

Chomet, Marc, to Teleglobe Pay-TV System, Inc. Method and apparatus for encoding audio signals in television systems. 4,148,063, Cl. 358-114.000.

Chown, Martin, to International Standard Electric Corporation. Process for manufacturing an optical fiber termination. 4,147,402, Cl. 350-96.180.

Christian Rovsing A/S: *See*—
Seiersen, Ole S., 4,148,025, Cl. 343-5.0VQ.

Christianson, Raymond A. Diaphragm assembly for the demand regulator of a breathing apparatus. 4,147,176, Cl. 137-102.000.

Christy, Mark H.; and Spencer, Lloyd. Multiple emitter flow control. 4,147,307, Cl. 239-542.000.

Chrysler Corporation: *See*—
Brandon, Thomas A., Jr.; and Beyer, Norman H., 4,147,270, Cl. 220-22.000.

Chung, Rack H., to BASF Wyandotte Corporation. Preparation of N-substituted carbamates. 4,147,716, Cl. 260-465.00D.

Chuvpilo, Albert V.: *See*—
Pronko, Vladimir G.; Onosovsky, Evgeny V.; Chuvpilo, Albert V.; Zhuravleva, Irina N.; Korneev, Viktor A.; Klimenkov, Dmitry A.; Smirnova, Galina M.; Usanov, Vladimir V.; Ivanov, Jury I.; Chernyshev, Boris A.; Nikitkin, Vasily D.; Nikolaev, Anatoly F.; Trizno, Maya S.; Karkozov, Valery G.; Verkhoglyadova, Tatyana J.; Moskalev, Evgeny V.; and Yakovleva, Lidia I., 4,147,210, Cl. 165-165.000.

Ciba-Geigy AG: *See*—
Michaelis, Klaus P.; and Wirth, Hermann O., 4,147,666, Cl. 252-48.200.
Topfl, Rosemarie, 4,147,585, Cl. 162-135.000.

Ciba-Geigy Corporation: *See*—
Dingwall, John G.; Baylis, Eric K.; and Campbell, Colin D., 4,147,780, Cl. 424-211.000.
Gunter, Franz; and Eckhardt, Claude, 4,147,648, Cl. 252-89.00B.
Huebner, Charles F., 4,147,786, Cl. 424-251.000.
Kunz, Walter; Eckhardt, Wolfgang; and Hubele, Adolf, 4,147,792, Cl. 424-269.000.
Woodward, Robert B.; and Bickel, Hans, 4,147,864, Cl. 544-16.000.

Cise, Michael D.: *See*—
Bornstein, Michael; and Cise, Michael D., 4,146,971, Cl. 34-5.000.

Citizen Watch Company Limited: *See*—
Ichikawa, Singo, 4,147,022, Cl. 58-35.00W.
Sekiya, Fukuo; Ebihara, Heihachiro; and Nishimura, Katsuo, 4,148,015, Cl. 340-763.000.
Shimizu, Shotaro, 4,147,416, Cl. 350-357.000.

Claesson, Per-Goran. Coupling arrangement. 4,147,445, Cl. 403-372.000.

Clairol Inc.: *See*—
Walter, Henry J.; and Kunz, Raymond W., 4,147,921, Cl. 219-211.000.

Clarke, Inc.: *See*—
Clarke, Robert R., 4,147,498, Cl. 431-202.000.

Clarke, Peter A., to Molins Limited. Apparatus for feeding rod-like articles. 4,147,247, Cl. 198-347.000.

Clarke, Robert R., to Clarke, Inc. Ignition assembly for flare stacks. 4,147,498, Cl. 431-202.000.

Clemence, Francois: *See—*
Allais, Andre; Clemence, Francois; and Deraedt, Roger, 4,147,790, Cl. 424-250.000.

Clesid S.A.: *See—*
Gay, Pierre, 4,147,202, Cl. 164-436.000.

Clews, John C.; and Goodwin, Austin G., to British Federal Welder & Machine Co. Limited. Weld gap shears for a flash welding machine. 4,147,913, Cl. 219-97.000.

Clinical Engineering Laboratory Limited: *See—*
Ikebe, Jun; Kumagai, Yoriaki; Takakura, Kintomo; and Ohta, Michio, 4,147,161, Cl. 128-2.00R.

CMI Corporation: *See—*
Garbelman, David L.; Minor, William H.; and Shaw, Arthur G., 4,147,436, Cl. 366-25.000.

Coenan, Michel J. W., to Coenen Benelux B.V. Safety belt. 4,147,387, Cl. 297-388.000.

Coenen Benelux B.V.: *See—*
Coenan, Michel J. W., 4,147,387, Cl. 297-388.000.

Cohen, Eleanor B.; Stassen, William N.; and Wintgens, James C., to Owens-Corning Fiberglas Corporation. Size compositions for glass fiber reinforced cementitious products. 4,147,555, Cl. 106-99.000.

Cohen, Jerome M.: *See—*
Pindar, John F.; and Cohen, Jerome M., 4,147,643, Cl. 252-52.00R.

Cohen, Leslie. Curved finishing band for garments. 4,146,934, Cl. 2-127.000.

Colburn, Richard H.; Anderhalt, Donald A.; and Stevenson, Robert A., to Globe-Union Inc. Series feed-through capacitor. 4,148,003, Cl. 333-181.000.

Colecchi, Paul, to A. B. Dick Company. Ribbon cartridge with improved ribbon tensioning and locking. 4,147,439, Cl. 400-208.000.

Coleman, Ross W.: *See—*
Chantler, Douglas A.; and Coleman, Ross W., 4,147,231, Cl. 182-172.000.

Colgate-Palmolive Company: *See—*
Marchesani, Cesare N., 4,147,053, Cl. 73-104.000.

Combustion Engineering, Inc.: *See—*
Gogineni, Madanamohana R.; Rader, Philip C.; and Rocznick, Wilfred R., 4,147,755, Cl. 423-242.000.
McGee, John K., 4,147,325, Cl. 251-25.000.

Combustion Unlimited Incorporated: *See—*
Straitz, John F., III, 4,147,493, Cl. 431-15.000.

Communication Mfg. Company: *See—*
O'Dea, Orrin B., 4,147,901, Cl. 179-175.20R.

Compagnie Generale des Etablissements Michelin: *See—*
Jarry, Jean, 4,147,196, Cl. 157-13.000.

Compak Systems, Inc.: *See—*
Penick, Ib; and Volkert, John K., 4,146,983, Cl. 40-124.100.

Computer Peripherals, Inc.: *See—*
Mishark, Joseph E.; Peters, Robert N.; and Pyszel, Kenneth S., 4,147,440, Cl. 400-611.000.

Conibear, Frank, to Woodstream Corporation. Safety catch. 4,146,990, Cl. 43-88.000.

Connors, John D.: *See—*
Newman, Richard W.; and Connors, John D., 4,147,163, Cl. 128-9.000.

Continental Group, Inc., The: *See—*
Mascia, Carmen T.; and Hasegawa, Gary K., 4,147,283, Cl. 222-399.000.

Continental Oil Company: *See—*
Dodd, John R., 4,147,625, Cl. 210-50.000.

Cook, Elton S.; and Fujii, Akira, to Stanley Drug Products, Inc. Method of treating bacterial infections. 4,147,802, Cl. 424-319.000.

Cook, George E.: *See—*
Merrick, George J.; Cook, George E.; and Modglin, Donald D., 4,147,920, Cl. 219-137.630.

Cooke, Brian A.: *See—*
Brock, Michael; and Cooke, Brian A., 4,147,567, Cl. 148-6.15Z.

Cooke, Laurence H.: *See—*
Buelow, Fred K.; Zasio, John J.; and Cooke, Laurence H., 4,147,937, Cl. 250-492.00A.

Cooney, John R. Radio direction finding system. 4,148,034, Cl. 343-106.00D.

Corbo, Kenneth P.; Shepard, Richard W.; Ross, William A.; and Ashmead, Albert S., to Torrington Company, The. Method of making textile element. 4,147,570, Cl. 148-144.000.

Corompt, Antoine, to Bennes Marrel. Semi-trailer for handling and transporting standardized containers. 4,147,266, Cl. 414-480.000.

Cortopassi, Alvin G.: *See—*
Cortopassi, Dean A.; and Cortopassi, Alvin G., 4,147,017, Cl. 56-16.500.

Cortopassi, Dean A.; and Cortopassi, Alvin G. Tomato harvester. 4,147,017, Cl. 56-16.500.

Costello, Matthew J.; Saunders, Thomas K.; and DeLuca, Albert M., to Graphic Sciences, Inc. Facsimile machine. 4,148,076, Cl. 358-286.000.

Couch, Everett O.: *See—*
Sprigg, E. Glenn; Couch, Everett O.; and Hendrix, Shelby D., 4,147,328, Cl. 254-89.00R.

Cough, Roy L., Jr. Guitar. 4,147,086, Cl. 84-312.00P.

Courier de Mere, Henri E. F. M., to BICOSA Societe de Recherches. Voltage boosting transformer and an electronic ignition gas lighter using such a transformer. 4,147,499, Cl. 431-255.000.

Cox, Bernd: *See—*
Adrian, Renate; von Schenck, Raban; Cox, Bernd; and Wirtz, Peter, 4,147,758, Cl. 423-315.000.

Crane, Walton B., to Industrial Designs & Services. Produce lug box with cored-out plastic end walls overlapped by side and bottom body wrapper. 4,147,289, Cl. 229-23.00R.

Crean, Peter A.; and Lavallee, Pierre A., to Xerox Corporation. Scanning array configuration. 4,147,928, Cl. 235-454.000.

Cricchi, James R.; Blaha, Franklyn C.; and Fitzpatrick, Michael D., to Westinghouse Electric Corp. Radiation hardened drain-source protected MNOS transistor. 4,148,049, Cl. 357-23.000.

Crosby, Clyde, to Gladwin, Inc. Plastic sheet stamping apparatus. 4,147,484, Cl. 425-142.000.

Cross, Evelyn. Footwear. 4,146,980, Cl. 36-39.000.

Cross, Ronald J.: *See—*
Brown, Douglas H.; Cross, Ronald J.; and MacNicol, David D., 4,147,735, Cl. 260-674.0WC.

Crouse, Dennis N.: *See—*
Walsh, Fraser M.; Crouse, Dennis N.; and Ajami, Alfred M., 4,147,840, Cl. 429-50.000.

Crowe, William D., to J. R. Schneider Co., Inc. Filter apparatus. 4,147,635, Cl. 210-401.000.

Crowell, John M.: *See—*
Hodge, Lee R.; Crowell, John M.; and Rogers, Richard A., 4,147,215, Cl. 116-315.000.

Crown Zellerbach Corporation: *See—*
Reba, Imants, 4,147,287, Cl. 226-7.000.

Crutchfield, Marvin M.; and Lannert, Kent P., to Monsanto Company. 1,4-Dioxane polycarboxylates. 4,147,702, Cl. 260-340.600.

Crystal, Harold: *See—*
George, Peter A.; and Crystal, Harold, 4,147,224, Cl. 177-210.0FP.

Cully, Edward L. Vehicle tow trailer. 4,147,373, Cl. 280-445.000.

Cumming, William J.: *See—*
Aldrich, Ralph E.; Cumming, William J.; and Simmons, William A., Jr., 4,147,656, Cl. 252-299.000.

Cummings, Kirk B.: *See—*
McLagan, Angus; and Cummings, Kirk B., 4,148,011, Cl. 340-147.0LP.

Curtice, Walter R., to RCA Corporation. Time displaced signal sorting apparatus. 4,147,941, Cl. 307-232.000.

D.A.B. Industries, Inc.: *See—*
Body, Alexander S., 4,147,914, Cl. 219-86.900.

Dahlquist, Ernst A.: *See—*
Frederick, Sherman B.; and Dahlquist, Ernst A., 4,147,263, Cl. 414-718.000.

Dahlstrom, Claes-Inge S. Mold element for concrete-casting. 4,147,322, Cl. 249-40.000.

Dahlstrom, Donald A.; Ellison, William; and Wilhelm, James H., to Envirotech Corporation. Combustion gas scrubbing system. 4,147,756, Cl. 423-242.000.

Daiichi Seiyaku Co., Ltd.: *See—*
Kamada, Masahiro; and Mimura, Masataka, 4,147,876, Cl. 560-37.000.

Daikin Kogyo Co., Ltd.: *See—*
Izumo, Masanori, 4,147,523, Cl. 55-208.000.

Daimler-Benz Aktiengesellschaft: *See—*
Hass, Jurgen, 4,147,139, Cl. 123-41.540.

Daimler-BenzAktiengesellschaft: *See—*
Hohenberg, Gunter; and Kurr, Detlef, 4,147,054, Cl. 73-117.300.

Dainippon Pharmaceutical Co., Ltd.: *See—*
Kobayashi, Akio; Shimohiro, Yoshiyuki; Shimizu, Kisaburou; and Murakami, Yoshiaki, 4,147,512, Cl. 8-165.000.

Dainippon Screen Seizo Kabushiki Kaisha: *See—*
Nishikawa, Yukio; Ono, Yoshio; and Nishida, Fumihiko, 4,147,428, Cl. 355-88.000.

Daiwa Can Company, Limited: *See—*
Yamaguchi, Hisakichi, 4,147,271, Cl. 220-70.000.

D'Amico, Paul M.: *See—*
Carpenter, Michael P.; and D'Amico, Paul M., 4,147,904, Cl. 179-178.000.

Dana Corporation: *See—*
Mazziotti, Philip J.; and Hobson, Donald E., 4,147,225, Cl. 180-44.00R.

Dart Industries Inc.: *See—*
Bateman, Robert F.; and Boucher, Richard A., 4,147,277, Cl. 220-400.000.

Daugherty, Denny E.: *See—*
Sabatelli, Philip M.; and Daugherty, Denny E., 4,147,650, Cl. 252-103.000.

d'Auria, Luigi; Jacques, Andre; and Moronvalle, Chantal, to Thomson-CSF. Positioning substrate for optical fibres. 4,147,403, Cl. 350-96.180.

Dautel, Helmut; Fritz, Mathias; and Bar, Gerd, to Emil Dautel, Kipperbau, Firma. Loading device for goods vehicles. 4,147,261, Cl. 414-557.000.

Davidson, Howard R.; and Bayley, Brian J., to Beckman Instruments, Inc. Rotor carrier for microtitration plate. 4,147,294, Cl. 233-26.000.

Davis, Donald C.: *See—*
Bienkowski, Joseph V.; Romime, Donald J.; and Davis, Donald C., 4,147,513, Cl. 23-232.00E.

Davis, Oliver T.; and Jones, Norman R. Electrical filtered air heater. 4,147,923, Cl. 219-368.000.

Davis, Ronald J.; and Boyer, Thomas W., to B. F. Goodrich Company, The. Process for removal of chloroform and carbon tetrachloride from chlorinated polyvinyl chloride. 4,147,859, Cl. 528-496.000.

Davis, William F., to Motorola, Inc. Amplifier circuit having a high degree of common mode rejection. 4,147,992, Cl. 330-288.000.

Day, Dallas C., to Interior Wood Products, Inc. Assembly jig for prefabricated door unit. 4,146,954, Cl. 29-467.000.

Day, Stephen W.; and Hutcheson, Daniel M. Composite wall panel assembly and method of production. 4,147,004, Cl. 52-309.900.

Dea, Frank J.; Fairbairn, William D.; and Novack, Michael W., to Nelson Research & Development Company. Microbicidal composition. 4,147,769, Cl. 424-47.000.

De Brebisson, Michel: *See*—
Edlinger, Wolfgang F. J.; De Brebisson, Michel; Biet, Jean-Pierre H.; and Decrouen, Jean-Michel, 4,148,055, Cl. 357-44.000.

deBruyne, Norman A. Oscillatory mechanisms. 4,147,516, Cl. 422-99.000.

Deconinck, Luc: *See*—
Deliege, Jacques; Giot, Michel; Obolensky, Vsevolod; Deconinck, Luc; and Lejeune, Marc, 4,147,390, Cl. 299-8.000.

DeCou, Donald F.: *See*—
Caraher, James R.; Rappoport, William M.; DeCou, Donald F.; and Deits, William C., 4,147,950, Cl. 313-181.000.

Decrouen, Jean-Michel: *See*—
Edlinger, Wolfgang F. J.; De Brebisson, Michel; Biet, Jean-Pierre H.; and Decrouen, Jean-Michel, 4,148,055, Cl. 357-44.000.

Deere & Company: *See*—
Jensen, James K.; and Hoeksema, Joe H., 4,147,016, Cl. 56-15.800.

DeHart, Kenneth L.; and Wing, Raymond C., to Pine Rest Christian Rehabilitation Services. Extrusion apparatus for making fire kindling device. 4,147,518, Cl. 44-13.000.

Deines, Siegmund; Swiercinsky, Gary L.; and Engstrom, Craig E., to Teledyne Industries, Inc. Water control and distribution apparatus. 4,147,631, Cl. 210-137.000.

Deisch, Cecil W., to Bell Telephone Laboratories, Incorporated. DC to DC converter utilizing current control for voltage regulation. 4,148,097, Cl. 363-26.000.

Deits, William C.: *See*—
Caraher, James R.; Rappoport, William M.; DeCou, Donald F.; and Deits, William C., 4,147,950, Cl. 313-181.000.

De Jonge, Cornelis R. H.; and Giezen, Egenius A., to Akzona Incorporated. Novel antioxidant composition and process for making the same. 4,147,659, Cl. 252-400.00A.

Deliege, Jacques; Giot, Michel; Obolensky, Vsevolod; Deconinck, Luc; and Lejeune, Marc, to Union Miniere S.A. Nodule dredging apparatus and process. 4,147,390, Cl. 299-8.000.

Delle-Alsthom: *See*—
Pham Van, Doan, 4,148,085, Cl. 361-13.000.

DeLuca, Albert M.: *See*—
Costello, Matthew J.; Saunders, Thomas K.; and DeLuca, Albert M., 4,148,076, Cl. 358-286.000.

Demit, Joel, to Ceraver. Method of manufacturing $\beta$ SiAlON compounds. 4,147,759, Cl. 423-327.000.

Dennis, Kent S.: *See*—
Bozzelli, John W.; and Dennis, Kent S., 4,147,852, Cl. 526-272.000.

Deraedt, Roger: *See*—
Allais, Andre; Clemence, Francois; and Deraedt, Roger, 4,147,790, Cl. 424-250.000.

Derby, Ralph F., Jr., to Raytheon Company. Method for making a magnetron anode. 4,146,949, Cl. 29-25.140.

DeRespiris, Donald L.: *See*—
O'Leary, Kevin J.; Hora, Charles J.; and DeRespiris, Donald L., 4,147,599, Cl. 204-87.000.

Deritend Engineering Company Limited, The: *See*—
Bishop, Thomas D., 4,147,078, Cl. 83-74.000.

Derner, William J., to FMC Corporation. Geared belt for positive drive transmission. 4,147,069, Cl. 74-231.00C.

Derr, Paul B.: *See*—
Snyder, Clair W., Jr.; Paullus, Clarence L.; and Derr, Paul B., 4,147,400, Cl. 339-217.00S.

De Shay, Harry W.: *See*—
Mayhew, Harry E.; and De Shay, Harry W., 4,147,317, Cl. 244-116.000.

DeSoto, Inc.: *See*—
Brook, Richard L.; Gaske, Joseph E.; Kearney, Thomas E.; and Wydeen, Russell D., 4,147,253, Cl. 206-205.000.

Dettmann, Heinrich; and Uhl, Ernst, to Burkert GmbH. Multilayer seals and method for their production and joining to seal carriers. 4,147,824, Cl. 428-65.000.

Deutsch, Daniel H. Asymmetric permeable member. 4,147,480, Cl. 417-572.000.

Deutsch, Daniel H. Asymmetric permeable member. 4,147,481, Cl. 417-572.000.

Deutsche Gold- und Silber Scheideanstalt vormals Roessler: *See*—
Beschke, Helmut; and Friedrich, Heinz, 4,147,874, Cl. 546-251.000.

Deutschlander, Gert, to SIG Schweizerische Industrie-Gesellschaft. Apparatus for sealing and cutting filled wrappers. 4,147,583, Cl. 156-510.000.

Dever, Gerald V., Jr.; and Chiocchio, Louis R., to Olin Corporation. Generation of polyurethane foam. 4,147,746, Cl. 264-39.000.

De Volder, Noel J.; and Gilliams, Yvan K., to AGFA-GEVAERT N.V. Electrophoretic development. 4,147,812, Cl. 427-17.000.

DeWitt, Charles M., Jr. Tortilla warmer. 4,147,924, Cl. 219-417.000.

Diamond, Julius; and Douglas, George H., to William H. Rorer, Inc. Amidinourea local anesthetics. 4,147,804, Cl. 424-322.000.

Diamond Shamrock Corporation: *See*—
Babinsky, Andrew D.; and Hora, Charles J., 4,147,844, Cl. 521-27.000.
O'Leary, Kevin J.; Hora, Charles J.; and DeRespiris, Donald L., 4,147,599, Cl. 204-87.000.
Schenker, Barry A.; Sugano, Thomas T.; Stillman, Neil W.; and O'Leary, Kevin J., 4,147,605, Cl. 204-180.00P.
Solomon, Frank; and Grun, Charles, 4,147,839, Cl. 429-15.000.

Dickson, Andrew C.; and Morrette, Richard A., to Owens-Illinois, Inc. Heating system for the manufacture of plastics articles. 4,147,487, Cl. 425-174.400.

Diesch, Robert E.; and Strunc, Gerald R., to Pako Corporation. Multichannel indicia sensor for automatic photographic paper cutter. 4,147,080, Cl. 83-371.000.

Dieterich, Dieter, to Bayer Aktiengesellschaft. Storable mixtures containing aromatic isocyanatosulphonic acids. 4,147,653, Cl. 252-182.000.

Diethorn, Lionel J., to Raptes, M. Ted. Domical-type structure. 4,146,997, Cl. 52-81.000.

Dietrich, Werner: *See*—
La Spina, Andrea; Dietrich, Werner; and Schliebs, Reinhard, 4,147,710, Cl. 260-429.900.

Dill, Aloys J.: *See*—
Borner, William G.; Dill, Aloys J.; and Fisher, Gordon L., 4,147,597, Cl. 204-12.000.

Dillon, Peter L. P.; and Bayer, Bryce E., to Eastman Kodak Company. Signal processing for discrete-sample-type-color-video signal. 4,148,059, Cl. 358-37.000.

Dimmick, Paul R., to Polaris N.V., Inc. Motion analyzing system. 4,147,977, Cl. 324-121.00R.

Dingwall, John G.; Baylis, Eric K.; and Campbell, Colin D., to Ciba-Geigy Corporation. Alpha aminophosphonous acids for inhibiting bacteria and yeast. 4,147,780, Cl. 424-211.000.

Dixit, Anant D.: *See*—
Garrison, Lilburn H.; and Dixit, Anant D., 4,147,584, Cl. 156-612.000.

Dobbie, Graham J.: *See*—
Langham, Maurice E., 4,147,785, Cl. 424-250.000.

Dr. Ing. Rudolf Hell, GmbH: *See*—
Witthandt, Helge, 4,148,009, Cl. 340-146.30H.

Dodd, John R., to Continental Oil Company. Method for clarifying discolored trimethylhydroquinone solutions. 4,147,625, Cl. 210-50.000.

Dokus, Edwin A.; and Naylor, Thomas K., to American Optical Corporation. Fast-recovery circuit. 4,147,990, Cl. 330-11.000.

Dolak, Lester A., to Upjohn Company, The. Derivatives of novobiocin. 4,147,704, Cl. 260-343.450.

Dolan, Myles G. Energy trap. 4,147,415, Cl. 350-321.000.

Domland, Christoph; and Lotzmann, Manfred, to Volkswagenwerk Aktiengesellschaft. Ignition coil current control circuit. 4,147,145, Cl. 123-148.00E.

Domtar Inc.: *See*—
Findlay, David M.; and McLean, Ronald A. N., 4,147,626, Cl. 210-52.000.

Donley, Harold E., to PPG Industries, Inc. Nonflammable beta diketonate composition. 4,147,556, Cl. 106-287.180.

Dorawala, Tansukhlal G.; Kerr, Edwin R.; Kochis, Robert G.; and Koniz, Leon F., to Texaco Inc. Process for dealkylating an alkylaromatic hydrocarbon using supported catalyst. 4,147,734, Cl. 260-672.00R.

Dornhoff, Gunther: *See*—
Korner, Jorg-Peter; Stalzer, Josef; Dornhoff, Gunther; and Kopl, Manfred, 4,147,517, Cl. 422-242.000.

Dorsch, Norman: *See*—
Schiller, August; Dorsch, Norman; and Sommer, Owsin, 4,147,855, Cl. 528-23.000.

Douglas, George H.: *See*—
Diamond, Julius; and Douglas, George H., 4,147,804, Cl. 424-322.000.

Dow Chemical Company, The: *See*—
Bennett, Robert B., 4,146,952, Cl. 29-452.000.
Bozzelli, John W.; and Dennis, Kent S., 4,147,852, Cl. 526-272.000.
Dunbar, Joseph E., 4,147,723, Cl. 260-556.00A.
Eickholt, Kathryn A.; and Grubbs, Robert H., 4,147,725, Cl. 260-578.000.
Fiske, Tom R.; and Baugh, Daniel W., Jr., 4,147,733, Cl. 260-653.400.
Freedman, Harold H.; McGregor, Stanley D.; Yoshimine, Masao; and Kroposki, Lorraine M., 4,147,866, Cl. 544-243.000.
Wilson, Charles A., 4,147,784, Cl. 424-250.000.

Dow Corning Corporation: *See*—
Cappo, Gerald R., 4,147,646, Cl. 252-63.700.
Schweiger, Carl W., 4,147,847, Cl. 521-112.000.

Dowa Engineering Co., Ltd.: *See*—
Ogasawara, Toshiya; Kubo, Norimasa; Nagino, Hiroshi; Takeda, Mamoru; and Ochiishi, Masanori, 4,147,452, Cl. 405-134.000.

Dowa Mining Co., Ltd.: *See*—
Ogasawara, Toshiya; Kubo, Norimasa; Nagino, Hiroshi; Takeda, Mamoru; and Ochiishi, Masanori, 4,147,452, Cl. 405-134.000.

Doyle, Ross L.: *See*—
Harrison, Thomas S.; and Doyle, Ross L., 4,147,441, Cl. 401-208.000.

Draftex Development AG: *See*—
Kruschwitz, Werner, 4,147,006, Cl. 52-401.000.

Drake, William O.; Finck, Hans-Werner; Mayerhoefer, Horst; and Mueller, Woflgang H., to Sandoz Ltd. Flameproofing compositions comprising a triester of phosphorous phosphoric or thiophosphoric acid and a haloalkyl aryl ether. 4,147,636, Cl. 252-8.100.

Dresser Industries, Inc.: *See—*
Caswell, Richard L., 4,147,096, Cl. 98-122.000.
Drinkuth, William H., to United Technologies Corporation. Contour inspection. 4,147,433, Cl. 356-390.000.
Du Pont of Canada Limited: *See—*
Kershaw, Bernard J., 4,147,717, Cl. 260-465.80R.
Dubois, Jean-Claude; Nguyen, Huu T.; and Zann, Annie, to Thomson-CSF. Liquid crystals with improved properties and devices using such liquid crystals. 4,147,655, Cl. 252-299.000.
Dubovik, Alexandr I.: *See—*
Suslin, Vladimir I.; Dubovik, Alexandr I.; Makeev, Boris A.; Pilipenko, Vitaly A.; Lekarev, Zinovy A.; and Kolyshkin, Boris S., 4,147,609, Cl. 204-224.00M.
Duderstadt, John F.; Gresens, Henry L.; and Kolowski, Michael A., to Goodyear Tire & Rubber Company, The. Method of making a pneumatic tire. 4,147,751, Cl. 264-326.000.
Dugan, John J.: *See—*
Miasek, Peter G.; and Dugan, John J., 4,147,611, Cl. 208-108.000.
Miasek, Peter G.; and Dugan, John J., 4,147,612, Cl. 208-108.000.
Duhem, Victor, to Fives-Cail Babcock. Rotating heat exchanger. 4,146,975, Cl. 34-134.000.
Dullinger, Karl: *See—*
Kronseder, Hermann; and Dullinger, Karl, 4,147,011, Cl. 53-137.000.
Dulog, Lothar G.; and Maasbol, Alfred G., to s.a. Texaco Belgium n.v. Detergent composition containing sulfinyl dipropionic acids. 4,147,673, Cl. 252-548.000.
Dunbar, Joseph E., to Dow Chemical Company, The. 2-(Mercapto)-N,N'-p-phenylenebissulfonamides. 4,147,723, Cl. 260-556.00A.
Dunlop Limited: *See—*
Bond, Robert, 4,147,064, Cl. 73-596.000.
Dunn, Donnell L., to J. I. Case Company. Self-actuating fluid holding system. 4,147,093, Cl. 91-510.000.
Dunn, William H., to Singer Company, The. Sewing machine dual mode backtack control. 4,147,119, Cl. 112-317.000.
Du Pont de Nemours, E. I., and Company: *See—*
Bartlett, Philip L., 4,147,511, Cl. 8-94.180.
Farnham, William B.; and Johnson, Alexander L., 4,147,860, Cl. 536-4.000.
Finnicum, Loren T.; Munger, Stanley H.; and Novak, Donald P., 4,147,551, Cl. 96-94.00R.
Fuchs, Julius J., 4,147,878, Cl. 560-115.000.
Held, Robert P., 4,147,549, Cl. 96-85.000.
Lee, Kyu T., 4,147,788, Cl. 424-258.000.
Raynolds, Stuart, 4,147,851, Cl. 526-245.000.
Vassiliou, Eustathios; and Van Hoeven, William, Jr., 4,147,683, Cl. 260-29.60F.
Vasta, Joseph A., 4,147,674, Cl. 260-17.00R.
Dupont Energy Management Corporation: *See—*
Hicks, John R., 4,147,978, Cl. 324-142.000.
Durkee, John E., to Thomas Industries Inc. Security alarm transmission system. 4,148,019, Cl. 340-531.000.
Dutell, H. Gary: *See—*
Steffensen, Leslie M.; Dutell, H. Gary; and Rydell, Robert A., 4,146,973, Cl. 34-41.000.
Duval Corporation: *See—*
Vroom, David, 4,147,309, Cl. 241-215.000.
Dworak, Francis S., to Bell Telephone Laboratories, Incorporated. Method of automatic trunk testing. 4,147,902, Cl. 179-175.20R.
Dyachkovsky, Fridrikh S.: *See—*
Pomogailo, Anatoly D.; Lisitskaya, Alla P.; Oskin, Viktor S.; Dyachkovsky, Fridrikh S.; Ponomarev, Ardalion N.; and Gorkova, Nina S., 4,147,664, Cl. 252-429.00B.
Dykstra, Donald P., to Portable Laboratories, Inc. Trash compactor. 4,147,100, Cl. 100-48.000.
Dynamit Nobel Aktiengesellschaft: *See—*
Blumenfeld, Georg; Petersen, Egon N.; Richtzenhain, Hermann; Vogt, Wilhelm; and Vollkommer, Norbert, 4,147,881, Cl. 560-221.000.
E.D.I. Safety Devices, Inc.: *See—*
Elkin, Barry, 4,148,023, Cl. 340-628.000.
E M I Limited: *See—*
Holt, Lyn, 4,148,067, Cl. 358-128.000.
E M I-Varian Limited: *See—*
Tuck, Richard A., 4,147,954, Cl. 313-337.000.
E. R. Squibb & Sons, Inc.: *See—*
Hauck, Frederic P.; and Fox, Rita T., 4,147,871, Cl. 544-394.000.
Wade, Peter C.; and Vogt, B. Richard, 4,147,698, Cl. 260-301.000.
Eastman Kodak Company: *See—*
Anderson, Richard B.; Hoffmeister, Elaine H.; and Landholm, Richard A., 4,147,544, Cl. 96-29.00D.
Campbell, Gerald A.; and Kelley, Richard N., 4,147,550, Cl. 96-87.00A.
Dillon, Peter L. P.; and Bayer, Bryce E., 4,148,059, Cl. 358-37.000.
Pacifici, James G.; and Newland, Gordon C., 4,147,603, Cl. 204-159.120.
Specht, Donald P.; and Farid, Samir Y., 4,147,552, Cl. 96-115.00R.
Thompson, John W.; and Wang, Richard H. S., 4,147,689, Cl. 260-45.9NC.
Eaton Corporation: *See—*
Johnson, Thomas E., 4,147,194, Cl. 144-309.0AC.
Ebco Industries, Ltd.: *See—*
Eppich, Helmut, 4,147,007, Cl. 52-570.000.
Eberle, Ludwig: *See—*
Kratel, Gunter; Stohr, Gunter; Eberle, Ludwig; and Muhlhofer, Ernst, 4,147,760, Cl. 423-336.000.
Ebihara, Heihachiro: *See—*
Sekiya, Fukuo; Ebihara, Heihachiro; and Nishimura, Katsuo, 4,148,015, Cl. 340-763.000.
Echlin Manufacturing Company, The: *See—*
Klimek, Boleslaw M.; and Mastis, Victor, 4,147,394, Cl. 303-118.000.
Eckhardt, Claude: *See—*
Gunter, Franz; and Eckhardt, Claude, 4,147,648, Cl. 252-89.00B.
Eckhardt, Wolfgang: *See—*
Kunz, Walter; Eckhardt, Wolfgang; and Hubele, Adolf, 4,147,792, Cl. 424-269.000.
Eco-Control, Inc.: *See—*
Walsh, Fraser M.; Crouse, Dennis N.; and Ajami, Alfred M., 4,147,840, Cl. 429-50.000.
Edgar, William D.: *See—*
Cain, George R.; Gidick, Ward F.; and Edgar, William D., 4,147,594, Cl. 201-39.000.
Edlinger, Wolfgang F. J.; De Brebisson, Michel; Biet, Jean-Pierre H.; and Decrouen, Jean-Michel, to U.S. Philips Corporation. Integrated circuit having complementary bipolar transistors. 4,148,055, Cl. 357-44.000.
Edwards, Robert A. Remote-indicating magnetic compass. 4,146,970, Cl. 33-363.00K.
Edwin Cooper and Company Limited: *See—*
Jayne, Gerald J. J.; Woods, David R.; and O'Brien, Joseph P., 4,147,640, Cl. 252-45.000.
Eggers, Charles F.: *See—*
Rutherford, John; and Eggers, Charles F., 4,147,600, Cl. 204-98.000.
Eichenbaum, Bernard R.; and Gardner, William B., to Bell Telephone Laboratories, Incorporated. Coatings for fiber waveguides. 4,147,407, Cl. 350-96.340.
Eickel, Rolf, to AGFA-Gevaert AG. Method of making tomographic images of X-rayed objects. 4,147,936, Cl. 250-445.00T.
Eickholt, Kathryn A.; and Grubbs, Robert H., to Dow Chemical Company, The. Process for preparing aniline compounds from amides with rhodium. 4,147,725, Cl. 260-578.000.
Eik, Geir, to A/S NorMar. Method for setting down or taking up a load from or upon a loading location by means of a crane and an apparatus for carrying out the method. 4,147,330, Cl. 254-173.00R.
Eilerman, George E.; and Tamosauskas, Albert E., to PPG Industries, Inc. Glass fiber coating composition. 4,147,833, Cl. 428-378.000.
Einhorn, Stephen. Handling latex paint. 4,148,101, Cl. 366-262.000.
Eisert, Manfred: *See—*
Kuesters, Werner; Heil, Guenter; Fischer, Martin; Eisert, Manfred; and Kast, Hellmut, 4,147,604, Cl. 204-159.230.
Eisner, Horst. Resilient reinforcement spacer. 4,147,008, Cl. 52-684.000.
Ekholm, Pertti: *See—*
Suovaniemi, Osmo A.; Ekholm, Pertti; Suni, Jukka; and Jarnefelt, Johan, 4,147,752, Cl. 422-57.000.
Elders, Gerald W. Roof pin. 4,147,458, Cl. 405-259.000.
Elderton, Robert W.: *See—*
Brooks, Joseph F.; and Elderton, Robert W., 4,147,470, Cl. 416-95.000.
Eleanor & Wilson Greatbatch Foundation: *See—*
Holmes, Curtis F.; and Mueller, Max A., 4,147,842, Cl. 429-101.000.
Electric Power Research Institute, Inc.: *See—*
Emery, Franklin T., 4,147,982, Cl. 324-54.000.
Rabinowitz, Mario; and Young, Frank S., 4,147,890, Cl. 174-127.000.
Eley, Edgar R., to Westinghouse Electric Corp. Circuit breaker. 4,147,999, Cl. 335-35.000.
Eli Lilly and Company: *See—*
Bornstein, Michael; and Cise, Michael D., 4,146,971, Cl. 34-5.000.
Elkem-Spigerverket A/S: *See—*
Karlsoen, Harald, 4,147,500, Cl. 432-2.000.
Elkin, Barry, to E.D.I. Safety Devices, Inc. Emergency exit indicator. 4,148,023, Cl. 340-628.000.
Ellenberger & Poensgen GmbH: *See—*
Krasser, Fritz, 4,148,002, Cl. 337-74.000.
Ellendt, Gunther: *See—*
Knofel, Hartmut; and Ellendt, Gunther, 4,147,724, Cl. 260-570.00D.
Ellison, William: *See—*
Dahlstrom, Donald A.; Ellison, William; and Wilhelm, James H., 4,147,756, Cl. 423-242.000.
Elms, Robert T., to Westinghouse Electric Corp. Energy-conserving solid-state-controlled illumination system. 4,147,961, Cl. 315-291.000.
Emde, Friedhelm: *See—*
Reinke, Friedhelm; Emde, Friedhelm; Geisel, Herbert; Gies, Rolf; Muller-Axt, Friedrich; Lange, Klaus; and Schoenen, Manfred, 4,147,569, Cl. 148-128.000.
Emery, Franklin T., to Electric Power Research Institute, Inc. Turbine generator ground current arcing detection apparatus and method. 4,147,982, Cl. 324-54.000.
Emil Dautel, Kipperbau, Firma: *See—*
Dautel, Helmut; Fritz, Mathias; and Bar, Gerd, 4,147,261, Cl. 414-557.000.
Endo, Hiroshi: *See—*
Okabayashi, Shigeru; Baba, Kousaku; and Endo, Hiroshi, 4,148,007, Cl. 340-52.00F.
Endo, Tomizo; Sumida, Yutaka; Kawahara, Toru; Ohtake, Masaichi; Motokawa, Shoichi; Nagayama, Keiji; Shigeta, Masatomo; Hozuma, Hiroshi; Tomizawa, Masaharu; and Kikuchi, Hideo, to Kureha Kagaku Kogyo Kabushiki Kaisha; and Chiyoda Chemical Engineer-

ing & Construction Co., Ltd. Apparatus for the thermal cracking of heavy hydrocarbon. 4,147,753, Cl. 422-202.000.
Endress & Hauser GmbH & Co.: *See*—
Brolde, Kurt, 4,147,989, Cl. 328-142.000.
Engel, Joseph C., to Westinghouse Electric Corp. Energy-conserving illumination system. 4,147,962, Cl. 315-291.000.
Engel, William K.; and Hansen, Robert C., to Caterpillar Tractor Co. Self-filling fluid device. 4,147,092, Cl. 91-490.000.
Engelhard Minerals & Chemicals Corporation: *See*—
Toenshoff, Donald A., 4,146,957, Cl. 29-612.000.
English Electric Valve Company Limited: *See*—
Esterson, Maurice, 4,147,953, Cl. 313-299.000.
King, Robin C. M., 4,147,955, Cl. 315-3.500.
Engstrom, Craig E.: *See*—
Deines, Siegmund; Swiercinsky, Gary L.; and Engstrom, Craig E., 4,147,631, Cl. 210-137.000.
Envirotech Corporation: *See*—
Dahlstrom, Donald A.; Ellison, William; and Wilhelm, James H., 4,147,756, Cl. 423-242.000.
Wegener, Willi A., 4,147,634, Cl. 210-396.000.
Eppich, Helmut, to Ebco Industries, Ltd. Matable modular elements for toy, display and model applications utilizing paired rib structure. 4,147,007, Cl. 52-570.000.
Erickson, Edward H., to Riker Laboratories, Inc. 8-(1H-Tetrazol-5-ylcarbamoyl)quinoline compounds. 4,147,694, Cl. 546-169.000.
Erickson, Erick E., to Marvin Glass & Associates. Vibrating game apparatus with loosely interfitting surface elements. 4,147,358, Cl. 273-241.000.
Ernst Leitz Wetzlar GmbH: *See*—
Mandler, Walter, 4,147,417, Cl. 354-25.000.
Espenshade, Marlin A.: *See*—
Calton, Gary J.; Espenshade, Marlin A.; and Ranieri, Richard L., 4,147,798, Cl. 424-279.000.
Esterson, Maurice, to English Electric Valve Company Limited. Cathode construction for linear beam tubes. 4,147,953, Cl. 313-299.000.
Evers, Robert C., to United States of America, Air Force. Fluorocarbon ether bibenzoxazole oligomers containing reactive acetylenic terminal groups. 4,147,858, Cl. 528-210.000.
Evtikhovich, Stanislav M.: *See*—
Gorodissky, Leonid G.; Evtikhovich, Stanislav M.; Grigoriev, Igor P.; Kvashnin, Nikolai A.; Sokolov, Vladislav I.; Chekreneva, Larisa S.; Birdus, Rostislav G.; Zaitseva, Maria A.; Kryazhev, Jury T.; Kuzminova, Galina V.; and Romanov, Nikolai T., deceased, 4,147,366, Cl. 277-22.000.
Extraversion, Inc.: *See*—
Ytter, Willy, 4,147,198, Cl. 160-135.000.
Exxon Production Research Company: *See*—
Ilfrey, William T.; Heilhecker, Joe K.; and Maus, Leo D., 4,147,221, Cl. 175-7.000.
Exxon Research & Engineering Co.: *See*—
Gladrow, Elroy M., 4,147,613, Cl. 208-120.000.
Ilnyckyj, Stephen, 4,147,520, Cl. 44-62.000.
Langer, Arthur W., Jr.; and Bunting, William M., 4,147,530, Cl. 75-0.50A.
Lundberg, Robert D.; Makowski, Henry S.; and Bock, Jan, 4,147,677, Cl. 260-23.50A.
Patton, Tad L., 4,147,684, Cl. 260-30.80R.
F. A. Hughes and Co., Ltd.: *See*—
Stevens, John E., 4,147,608, Cl. 204-196.000.
F. L. Smidth & Co.: *See*—
Mikkelsen, Bent E., 4,147,308, Cl. 241-117.000.
Fa. Franz Torwegge: *See*—
Torwegge, Helmut; and Steckstor, Rolf, 4,147,192, Cl. 144-251.00R.
Fabbrie, Gilbert R. Self-cleaning golf-shoe cleat. 4,146,979, Cl. 36-67.00D.
Fabrique Nationale Herstal S.A.: *See*—
Jeghers, Philippe M., 4,147,349, Cl. 273-77.00A.
Fairbairn, Thomas E., to Sirius Corporation. Split-flow nozzle for energy beam system. 4,147,916, Cl. 219-121.00P.
Fairbairn, William D.: *See*—
Dea, Frank J.; Fairbairn, William D.; and Novack, Michael W., 4,147,769, Cl. 424-47.000.
Fairchild Camera and Instrument Corporation: *See*—
Koepp, Ronald L., 4,148,018, Cl. 340-401.000.
Fang, Frank F.; and Shih, Kwang K., to International Business Machines Corporation. Multicolor light emitting diode array. 4,148,045, Cl. 357-17.000.
Farid, Samir Y.: *See*—
Specht, Donald P.; and Farid, Samir Y., 4,147,552, Cl. 96-115.00R.
Farland, Swen E.: *See*—
Siemer, Dennis K.; and Farland, Swen E., 4,148,020, Cl. 340-531.000.
Farnham, William B.; and Johnson, Alexander L., to Du Pont de Nemours, E. I., and Company. Process for preparing nitroaromatic glycosides. 4,147,860, Cl. 536-4.000.
Farrier Industries, Inc.: *See*—
Graybill, Robert W., 4,147,116, Cl. 110263-.
Fathauer, George H., to Medtronic, Inc. Digital liquid velocity measuring system. 4,147,059, Cl. 73-194.00A.
Fauth, Gunter; and Lermann, Peter, to AGFA-Gevaert AG. Collapsible camera. 4,147,421, Cl. 354-192.000.
Feeney, Brian P.: *See*—
Peters, Joseph, Jr.; and Feeney, Brian P., 4,147,087, Cl. 84-312.00R.
Felstein, Steven R.: *See*—
Middleton, Scott W.; Murray, Lee J., Jr.; and Felstein, Steven R., 4,147,836, Cl. 428-481.000.
Fenoglio, Francesco, to Societa Italiana Telecomunicazioni Siemens S.p.A. Expandable memory for the suppression of phase jitter in a telecommunication system. 4,147,895, Cl. 179-15.0AF.
Fesenko, Vsevolod K.: *See*—
Folomin, Anatoly A.; Fesenko, Vsevolod K.; Girutsky, Olgerd I.; and Paukh, Vyacheslav N., 4,147,245, Cl. 192-85.0AA.
Fiedler, Wayne: *See*—
Slobodzian, Gregory E.; Payne, Robert A.; and Fiedler, Wayne, 4,148,073, Cl. 358-240.000.
Fielding, Ivor R.: *See*—
Slama, Francis J.; and Fielding, Ivor R., 4,147,741, Cl. 260-878.00R.
Finck, Hans-Werner: *See*—
Drake, William O.; Finck, Hans-Werner; Mayerhoefer, Horst; and Mueller, Woflgang H., 4,147,636, Cl. 252-8.100.
Findlay, David M.; and McLean, Ronald A. N., to Domtar Inc. Treatment of mercury contaminated aqueous media. 4,147,626, Cl. 210-52.000.
Finn, Albert E.; and Ginns, Haskell, to Indikon Company, Inc., The. Rotating shaft alignment monitor. 4,148,013, Cl. 340-189.00M.
Finnicum, Loren T.; Munger, Stanley H.; and Novak, Donald P., to Du Pont de Nemours, E. I., and Company. Process for photographic emulsion precipitation in a recycle stream. 4,147,551, Cl. 96-94.00R.
Firey, Joseph C. Engine intake stratifier. 4,147,137, Cl. 123-32.0ST.
Firmenich SA: *See*—
Schulte-Elte, Karl-Heinrich; Willhalm, Bruno; and Gautschi, Fritz, 4,147,672, Cl. 252-522.000.
Firsty, Sherman, to Gloran Plastic, Inc. Photoelectrically controlled garment bagger. 4,147,010, Cl. 53-64.000.
Fischer, Earl L.; and Garmon, Lee F., Jr., to Victor United, Inc. Projectile propulsion and control in a gas-powered gun. 4,147,152, Cl. 124-76.000.
Fischer, Martin: *See*—
Kuesters, Werner; Heil, Guenter; Fischer, Martin; Eisert, Manfred; and Kast, Hellmut, 4,147,604, Cl. 204-159.230.
Fisher, Baxter. Mailbox flag device. 4,147,292, Cl. 232-35.000.
Fisher, Edward M. Chess game apparatus. 4,147,362, Cl. 273-282.000.
Fisher, Gordon L.: *See*—
Borner, William G.; Dill, Aloys J.; and Fisher, Gordon L., 4,147,597, Cl. 204-12.000.
Fiske, Tom R.; and Baugh, Daniel W., Jr., to Dow Chemical Company, The. Fluorination of chlorinated hydrocarbons. 4,147,733, Cl. 260-653.400.
Fitzpatrick, Michael D.: *See*—
Cricchi, James R.; Blaha, Franklyn C.; and Fitzpatrick, Michael D., 4,148,049, Cl. 357-23.000.
Fives-Cail Babcock: *See*—
Duhem, Victor, 4,146,975, Cl. 34-134.000.
Flanagan, Robert M.: *See*—
Heenan, Sidney A.; and Flanagan, Robert M., 4,147,447, Cl. 404-16.000.
Flashman, Arthur L. Vibratile mode speaker cabinet. 4,147,229, Cl. 181-144.000.
Fletcher, James C.; Tausworthe, Robert C.; and Chernoff, Ralph C. Phase conjugation method and apparatus for an active retrodirective antenna array. 4,148,031, Cl. 343-100.0TD.
Fling, William F.; and Stolzke, Paul A. Adjustable frame liquid level measuring device. 4,147,060, Cl. 73-321.000.
Flinn, Richard A.; and Trojan, Paul K. Process for the production of ferro-magnesium and the like. 4,147,533, Cl. 75-58.000.
Florjancic, Dusan: *See*—
Schiele, Otto; and Florjancic, Dusan, 4,147,465, Cl. 415-143.000.
Flowers, Theodore R.; and Pires, Antonio, to Sperry Rand Corporation. Thinning comb for powered hair trimmer. 4,146,960, Cl. 30-195.000.
Fluester, James F., to Spiralux Limited. Tool for setting threaded bushes. 4,147,047, Cl. 72-114.000.
FMC Corporation: *See*—
Berkowitz, Sidney, 4,147,720, Cl. 260-502.00R.
Derner, William J., 4,147,069, Cl. 74-231.00C.
Focke, Heinz, to Focke & Pfuhl. Device for conveying and storing cigarettes and the like. 4,147,251, Cl. 198-688.000.
Focke & Pfuhl: *See*—
Focke, Heinz, 4,147,251, Cl. 198-688.000.
Fogh, Hans M.; and Bastet, Evert J. Self-releasing traveler and cam cleat. 4,147,121, Cl. 114-204.000.
Foldes, Peter, to RCA Corporation. Helical antennas. 4,148,030, Cl. 343-895.000.
Foldes, Peter, to RCA Corporation. Subwavelength monopulse antenna. 4,148,035, Cl. 343-754.000.
Folomin, Anatoly A.; Fesenko, Vsevolod K.; Girutsky, Olgerd I.; and Paukh, Vyacheslav N., to Tsentralny Nauchno-Issledovatelsky Avtomobilny I Avtomotorny Institut (NAMI). Hydraulically operated friction clutch. 4,147,245, Cl. 192-85.0AA.
Fonteneau, Norman O.: *See*—
Haas, Steven L.; Fonteneau, Norman O.; and Moore, Randall W., 4,148,096, Cl. 362-252.000.
Ford Motor Company: *See*—
Warsinski, Robert G.; and Wlodyga, George R., 4,147,200, Cl. 164-4.000.
Forstermann, Ulrich: *See*—
Lather, Dieter; Janssen, Klaus-Uwe; Ries, Karl; Moller, Peter; and Forstermann, Ulrich, 4,147,065, Cl. 73-611.000.

Fortuna, John E., II: *See—*
Nelson, Larry J.; and Fortuna, John E., II, 4,147,393, Cl. 308-3.600.

Foster, Alan: *See—*
Bosselaar, Cornelis A.; and Foster, Alan, 4,148,053, Cl. 357-38.000.

Foster, L. Curtis; and Lindley, John P., to Itek Corporation. Radiation discrimination system. 4,147,424, Cl. 356-352.000.

Foster Wheeler Energy Corporation: *See—*
Steiner, Peter, 4,147,762, Cl. 423-569.000.

Fox, Rita T.: *See—*
Hauck, Frederic P.; and Fox, Rita T., 4,147,871, Cl. 544-394.000.

Foxx, Mary E.: *See—*
Klein, Robert W.; and Foxx, Mary E., 4,147,782, Cl. 424-230.000.

Fram Corporation: *See—*
Charles, Herbert N., 4,147,471, Cl. 416-132.00A.

Frangiskos, Antonios: *See—*
Gambopoulos, Theodor; and Frangiskos, Antonios, 4,147,614, Cl. 209-8.000.

Frank, Walter J., Jr., to Burndy Corporation. Split bolt connector with interlaced grooves in pressure pad. 4,147,446, Cl. 403-390.000.

Frankel, Milton B.; Raniere, Frederick D.; Thompson, Wallace W.; Witucki, Edward F.; and Woolery, Dean O., II, to Rockwell International Corporation. Process for nitroform isolation. 4,147,731, Cl. 260-644.000.

Franz, John E., to Monsanto Company. Process for producing N-phosphonomethylglycine salts. 4,147,719, Cl. 260-501.120.

Fraula, Louis F.; and Athey, Stuart E., to Hobart Corporation. Method for rinsing and chemically sanitizing food ware items. 4,147,558, Cl. 134-10.000.

Fraula, Louis F.; and Athey, Stuart E., to Hobart Corporation. Apparatus for rinsing and chemically sanitizing food ware items. 4,147,559, Cl. 134-57.00D.

Frederick, Sherman B.; and Dahlquist, Ernst A., to Lull Engineering Company, Inc. High lift loader with extended transfer. 4,147,263, Cl. 414-718.000.

Fredman, Harry; and Fredman, Irving. Bed rails with cross wire. 4,146,940, Cl. 5-9.00B.

Fredman, Irving: *See—*
Fredman, Harry; and Fredman, Irving, 4,146,940, Cl. 5-9.00B.

Free-Flow Packaging Corporation: *See—*
Fuss, Gunter G., 4,147,392, Cl. 302-52.000.

Freedman, Harold H.; McGregor, Stanley D.; Yoshimine, Masao; and Kroposki, Lorraine M., to Dow Chemical Company, The. Process for preparing phosphorothioates and phenylphosphonothioates. 4,147,866, Cl. 544-243.000.

Freeman, Leslie C., Sr. Lighting system for facilitating plant growth. 4,146,993, Cl. 47-17.000.

Freeman, Marshall E., to International Business Machines Corporation. Air flow system for a disk file. 4,147,299, Cl. 236-49.000.

French, Gordon B., to Occidental Oil Shale, Inc. Method for in situ recovery of liquid and gaseous products from oil shale deposits. 4,147,388, Cl. 299-2.000.

Friedman, Harvey S.; Lippert, Irving S.; and Lothrop, John W., to Polaroid Corporation. Photographic processing roller having a surface roughened by electric discharge machining. 4,147,425, Cl. 354-304.000.

Friedrich, Heinz: *See—*
Beschke, Helmut; and Friedrich, Heinz, 4,147,874, Cl. 546-251.000.

Friedrich, Helmut; and Schaper, Jurgen, to Vereinigte Flugtechnische Werke-Fokker GmbH. Formation of auxiliary drive gas for turbine. 4,147,025, Cl. 60-39.060.

Friedrich Kocks GmbH & Company: *See—*
Staat, Karl-Hans, 4,147,067, Cl. 74-29.000.

Frischmuth, Robert W.; and Sass, Allan, to Occidental Petroleum Corporation. Flash pyrolysis of organic solid waste employing ash recycle. 4,147,593, Cl. 201-21.000.

Fritz, Mathias: *See—*
Dautel, Helmut; Fritz, Mathias; and Bar, Gerd, 4,147,261, Cl. 414-557.000.

Fritzon, Hans G.: *See—*
Carlsson, Erik; Pejchal, Karel; Fritzon, Hans G.; Hagstrom, Staffan; Kerff, Anton; and Wide, Lars, 4,147,187, Cl. 139-196.200.

Fryer, Rodney I.: *See—*
Walser, Armin; Fryer, Rodney I.; and Benjamin, Louis, 4,147,875, Cl. 548-302.000.

Fuchs, Julius J., to Du Pont de Nemours, E. I., and Company. Herbicidal carbamates and thiolcarbamates. 4,147,878, Cl. 560-115.000.

Fuji Electric Co., Ltd.: *See—*
Matsushita, Shigetada, 4,147,058, Cl. 73-194.0EM.

Fuji Photo Film Co., Ltd.: *See—*
Akao, Mutsuo; and Kurechi, Taichi, 4,147,291, Cl. 229-55.000.
Karino, Yukio; and Nakamura, Taku, 4,147,548, Cl. 96-77.000.
Kato, Hajime; Igarashi, Akira; Matsukawa, Hiroharu; and Miyamoto, Akio, 4,147,830, Cl. 428-324.000.
Kubotera, Kikuo; Mizuki, Eiichi; Satomura, Masato; Iwano, Haruhiko; and Fujiwara, Tadahiro, 4,147,543, Cl. 96-29.00R.
Sato, Akira; Ikeda, Tadashi; Sakai, Takeo; Takei, Haruo; and Hayashi, Jun, 4,147,553, Cl. 96-122.000.
Shimamura, Isao; and Iwano, Haruhiko, 4,147,546, Cl. 96-60.00R.

Fujii, Akira: *See—*
Cook, Elton S.; and Fujii, Akira, 4,147,802, Cl. 424-319.000.

Fujiki, Norio, to Nissan Motor Company, Limited. Radar system for an anti-collision system for a vehicle. 4,148,028, Cl. 343-7.0VM.

Fujikura, Saburo: *See—*
Yada, Akira; Iijima, Isamu; Itakura, Jo; and Fujikura, Saburo, 4,147,682, Cl. 260-29.6SQ.

Fujimori, Noboru: *See—*
Habu, Teiji; Nakajima, Tomio; Sakamoto, Eiichi; Fujimori, Noboru; and Mine, Kiyomitsu, 4,147,542, Cl. 96-27.00E.
Koitabashi, Takeo; Fujimori, Noboru; and Itoh, Shigemasa, 4,147,547, Cl. 96-74.000.

Fujioka, Kazuyoshi, to Nissan Motor Company, Limited. Power transmission for use in industrial vehicle driveline and equipped with fluid actuated clutches. 4,147,242, Cl. 192-4.00A.

Fujishita, Toshio: *See—*
Hirai, Kentaro; Fujishita, Toshio; Ishiba, Teruyuki; and Sugimoto, Hirohiko, 4,147,700, Cl. 260-308.00R.

Fujitsu Limited: *See—*
Andoh, Shizuo; and Yoshikawa, Kazuo, 4,147,960, Cl. 340-769.000.
Buelow, Fred K.; Zasio, John J.; and Cooke, Laurence H., 4,147,937, Cl. 250-492.00A.

Fujiwara, Tadahiro: *See—*
Kubotera, Kikuo; Mizuki, Eiichi; Satomura, Masato; Iwano, Haruhiko; and Fujiwara, Tadahiro, 4,147,543, Cl. 96-29.00R.

Fujiwara, Tatsuo, to Tokyo Shibaura Electric Co., Ltd. Method for manufacturing a multipolar erasing head. 4,146,956, Cl. 29-603.000.

Fukamachi, Yoshihiro: *See—*
Kobayashi, Norio; and Fukamachi, Yoshihiro, 4,147,577, Cl. 156-123.00R.

Fukui, Seiji: *See—*
Segawa, Takashi; and Fukui, Seiji, 4,147,243, Cl. 192-6.00A.
Segawa, Takashi; and Fukui, Seiji, 4,147,244, Cl. 192-6.00A.

Fukuma, Nobuo; Kato, Yoshito; and Nogami, Kouji, to Toyota Jidosha Kogyo Kabushiki Kaisha. Switching device for feeder in machine tools. 4,147,965, Cl. 318-256.000.

Fukuoka, Shogo: *See—*
Miyoshi, Hideo; Shibata, Kiyoshi; Fukuoka, Shogo; and Aizawa, Tatsuo, 4,147,426, Cl. 355-3.0SH.

Fukushima, Takaki: *See—*
Shohata, Nobuaki; Ohno, Tomeji; Ikeda, Shigeru; Fukushima, Takaki; Igarashi, Ryuji; and Yoshida, Jyun-Ichiro, 4,147,670, Cl. 252-519.000.

Furucz, Istvan. Carburetion system for internal combustion motor. 4,147,144, Cl. 123-122.00A.

Fuss, Gunter G., to Free-Flow Packaging Corporation. Vehicular transport and conveyance system. 4,147,392, Cl. 302-52.000.

Futaba Denshi Kogyo K. K.: *See—*
Morimoto, Kiyoshi, 4,147,573, Cl. 148-175.000.

G.D. Societa per Azioni: *See—*
Seragnoli, Enzo, 4,147,013, Cl. 53-494.000.

Gaenzler, Wolfgang; Kabs, Klaus; and Schroeder, Guenter, to Rohm GmbH. Method for making methacrylic acid, its nitrile and its esters. 4,147,718, Cl. 260-465.900.

Gaetano, Mauro L.; and Skrovanek, Ambroz K., to Harvey Hubbell Incorporated. Telephone network protective coupler. 4,147,900, Cl. 179-170.00R.

Gale, Allen W., to Production Experts, Inc. Bar construction. 4,147,395, Cl. 312-140.200.

Gambopoulos, Theodor; and Frangiskos, Antonios. Aqueous mixture of diesel oil, pine oil and diamine for conditioning of crushed magnesite ore in magnetic beneficiation process. 4,147,614, Cl. 209-8.000.

Garbelman, David L.; Minor, William H.; and Shaw, Arthur G., to CMI Corporation. Method and apparatus for producing hot mix asphalt utilizing recyclable asphalt aggregate. 4,147,436, Cl. 366-25.000.

Garbuny, Max; and Phillips, D. Colin, to Westinghouse Electric Corp. Production of hydrogen and carbon dioxide. 4,147,602, Cl. 204-157.10R.

Garcia, Antonio A.; Ruiz, Juan R. C.; and Lozano, Juan B., to Laboratorios Liade, S.A. 1-Arylamidoethyl, 4-sulfonylpiperazines. 4,147,870, Cl. 544-383.000.

Gardner-Denver Company: *See—*
Shoop, John C.; Post, Roger L.; and Herschler, Michael G., 4,147,475, Cl. 417-310.000.

Gardner, William B.: *See—*
Eichenbaum, Bernard R.; and Gardner, William B., 4,147,407, Cl. 350-96.340.

Garmon, Lee F., Jr.: *See—*
Fischer, Earl L.; and Garmon, Lee F., Jr., 4,147,152, Cl. 124-76.000.

Garrison, Lilburn H.; and Dixit, Anant D., to Burroughs Corporation. Method for providing low cost wafers for use as substrates for integrated circuits. 4,147,584, Cl. 156-612.000.

Gaske, Joseph E.: *See—*
Brook, Richard L.; Gaske, Joseph E.; Kearney, Thomas E.; and Wydeen, Russell D., 4,147,253, Cl. 206-205.000.

Gath, Karl H. Method and apparatus for manufacturing continuous form sets. 4,147,338, Cl. 270-37.000.

Gatzke, Ronald D., to Hewlett-Packard Company. Defibrillator monitor baseline control. 4,147,162, Cl. 128-2.06B.

Gaunt, Frank L.; Hill, Horace E.; and Soderberg, Mark S., to Boeing Commercial Airplane Company. Lubricant applicator. 4,147,232, Cl. 184-1.00E.

Gautschi, Fritz: *See—*
Schulte-Elte, Karl-Heinrich; Willhalm, Bruno; and Gautschi, Fritz, 4,147,672, Cl. 252-522.000.

Gavin, David F.: *See—*
Goldstein, Stephen L.; and Gavin, David F., 4,147,846, Cl. 521-110.000.

Gay, Pierre, to Clesid S.A. Continuous casting ingot mould. 4,147,202, Cl. 164-436.000.

Geberit AG: *See—*
Stahli, Paul, 4,147,926, Cl. 219-535.000.

Geisel, Herbert: *See—*
Reinke, Friedhelm; Emde, Friedhelm; Geisel, Herbert; Gies, Rolf; Muller-Axt, Friedrich; Lange, Klaus; and Schoenen, Manfred, 4,147,569, Cl. 148-128.000.
Gelbard, Robert B.; and Schreck, Raymond M., to General Electric Company. High efficiency heat exchange for refrigeration suction line/capillary tube assembly. 4,147,037, Cl. 62-113.000.
Gelzheiser, Francis L., to Westinghouse Electric Corp. Circuit breaker with calibrating means. 4,148,004, Cl. 337-82.000.
Gendreu, Robert, to Thomson-CSF. System for tracking a moving target. 4,148,026, Cl. 343-5.0ST.
General Automation, Inc.: *See—*
McLagan, Angus; and Cummings, Kirk B., 4,148,011, Cl. 340-147.0LP.
General Electric Company: *See—*
Borman, Willem F. H., 4,147,738, Cl. 260-860.000.
Gelbard, Robert B.; and Schreck, Raymond M., 4,147,037, Cl. 62-113.000.
Lavallee, Francois A., 4,147,823, Cl. 428-35.000.
Lee, Gim F., Jr., 4,147,739, Cl. 260-876.00R.
Leffingwell, Edward A., 4,147,838, Cl. 429-1.000.
McMillan, Stephen L., 4,147,070, Cl. 74-242.11C.
Sargisson, Donald F., 4,147,029, Cl. 60-262.000.
Smith, Alfred H., Jr., 4,147,685, Cl. 260-31.20R.
Swiger, Roger T.; and Juliano, Peter C., 4,147,740, Cl. 260-878.00R.
Ward, William J., III, 4,147,754, Cl. 423-224.000.
Worst, Joseph C., 4,147,297, Cl. 236-12.00A.
Yang, Kei-Hsiung, 4,147,948, Cl. 313-101.000.
Yang, Kei-Hsiung, 4,147,949, Cl. 313-101.000.
Ziemba, Richard T., 4,147,109, Cl. 102-215.000.
General Motors Corporation: *See—*
Stolper, Richard, 4,147,386, Cl. 297-362.000.
General Signal Corporation: *See—*
Pinto, Louis J., 4,146,944, Cl. 15-321.000.
Geophysical Systems Corp.: *See—*
Kelm, Edward C., 4,148,006, Cl. 340-15.5TS.
George, Peter A.; and Crystal, Harold, to Plessey Handel und Investments AG. Bathroom scales. 4,147,224, Cl. 177-210.0FP.
Georgia-Pacific Corporation: *See—*
Steffensen, Leslie M.; Dutell, H. Gary; and Rydell, Robert A., 4,146,973, Cl. 34-41.000.
Geria, Navin; and Shaleesh, George, to Bristol-Myers Company. Method for eliminating shrinkage cavities in cast cosmetic sticks and similar products. 4,147,750, Cl. 264-255.000.
Geurtsen, Alfonsus A., to Machinefabriek Geurtsen Deventer B.V. Apparatuses to separate a mixture of liquids of different specific gravities, e.g. oil and water. 4,147,629, Cl. 210-104.000.
Gewerkschaft Eisenhutte Westfalia: *See—*
Unger, Eberhart; Jutle, Hans; and Stuckmann, Dieter, 4,147,453, Cl. 405-141.000.
Giannetti, Anthony. Easy glide cue guide. 4,147,346, Cl. 273-23.000.
Giddings, John C., to University of Utah. Method and apparatus for flow field-flow fractionation. 4,147,621, Cl. 210-22.00C.
Gidick, Ward F.: *See—*
Cain, George R.; Gidick, Ward F.; and Edgar, William D., 4,147,594, Cl. 201-39.000.
Gies, Rolf: *See—*
Reinke, Friedhelm; Emde, Friedhelm; Geisel, Herbert; Gies, Rolf; Muller-Axt, Friedrich; Lange, Klaus; and Schoenen, Manfred, 4,147,569, Cl. 148-128.000.
Giese, Everett I. Tree shearing apparatus. 4,147,191, Cl. 144-34.00E.
Giezen, Egenius A.: *See—*
De Jonge, Cornelis R. H.; and Giezen, Egenius A., 4,147,659, Cl. 252-400.00A.
Gilardi, Emilio: *See—*
Sandrone, Bruno; Nuccio, Giuseppe; and Gilardi, Emilio, 4,147,438, Cl. 400-144.200.
Gilbert, Arthur H., to Imperial Chemical Industries Limited. Conversion of cycloalkylhydroperoxides to alkane dicarboxylic acids. 4,147,883, Cl. 562-523.000.
Gilliams, Yvan K.: *See—*
De Volder, Noel J.; and Gilliams, Yvan K., 4,147,812, Cl. 427-17.000.
Gilst, Carl V., to AG Best, Inc. Pig nursery feeder. 4,147,132, Cl. 119-53.000.
Ginns, Haskell: *See—*
Finn, Albert E.; and Ginns, Haskell, 4,148,013, Cl. 340-189.00M.
Giot, Michel: *See—*
Deliege, Jacques; Giot, Michel; Obolensky, Vsevolod; Deconinck, Luc; and Lejeune, Marc, 4,147,390, Cl. 299-8.000.
Girguis, Sobhy; Krude, Werner; and Harz, Peter, to Uni-Cardan AG. Universal joint. 4,147,041, Cl. 64-17.00A.
Girmes-Werke AG: *See—*
Laus, Heinrich, 4,147,507, Cl. 8-1.0XB.
Girutsky, Olgerd I.: *See—*
Folomin, Anatoly A.; Fesenko, Vsevolod K.; Girutsky, Olgerd I.; and Paukh, Vyacheslav N., 4,147,245, Cl. 192-85.0AA.
Gladrow, Elroy M., to Exxon Research & Engineering Co. Hydrocarbon conversion process utilizing a catalyst comprising a zeolite, a zirconia-containing matrix and an adsorbent. 4,147,613, Cl. 208-120.000.
Gladwin, Inc.: *See—*
Crosby, Clyde, 4,147,484, Cl. 425-142.000.
Globe-Union Inc.: *See—*
Colburn, Richard H.; Anderhalt, Donald A.; and Stevenson, Robert A., 4,148,003, Cl. 333-181.000.
Gloran Plastic, Inc.: *See—*
Firsty, Sherman, 4,147,010, Cl. 53-64.000.
Goble, William M., to Moore Products Co. Stepper motor control. 4,147,968, Cl. 318-685.000.
Gochermann, Hans, to Licentia Patent-Verwaltungs-G.m.b.H. Solar cell arrangement for terrestrial use. 4,147,560, Cl. 136-89.00H.
Goddard, Bryan J.: *See—*
Chen, Evan N.; Beddall, Edward A.; and Goddard, Bryan J., 4,146,958, Cl. 30-47.000.
Gogineni, Madanamohana R.; Rader, Philip C.; and Roczniak, Wilfred R., to Combustion Engineering, Inc. Air pollution control process. 4,147,755, Cl. 423-242.000.
Goguel, Olivier P. Fish breeding cage structure. 4,147,130, Cl. 119-3.000.
Gokhberg, Pavel Y.; Gorbunov, Boris N.; Khardin, Alexandr P.; Rudkovsky, Vladimir L.; Belyaev, Valentin M.; Lukashov, Anatoly I.; Shpantseva, Ljudmila V.; and Orlyansky, Vitaly V. Method of preparing isoprene and isoamylenes. 4,147,736, Cl. 260-681.000.
Golda, Eugene: *See—*
Rowe, William; and Golda, Eugene, 4,147,545, Cl. 96-49.000.
Goldstein, Stephen L.; and Gavin, David F., to Olin Corporation. Alkoxysilane cluster surfactants for rigid polyurethane foam. 4,147,846, Cl. 521-110.000.
Golias, Tipton L., to Helena Laboratories Corporation. Clinical procedure for measuring lipoprotein triglycerides. 4,147,606, Cl. 204-180.00S.
Golovchinskaya, Elena S.; Chernov, Vladimir A.; Chaman, Elena S.; Nikolaeva, Ljudmila A.; and Korsunsky, Vyacheslav S. 2-Dimethylamino-6-diethylenimidophosphamido-7-methyl-purine. 4,147,867, Cl. 544-244.000.
Gonas, Edward J.; and Helfritch, Dennis J., to American Precision Industries Inc. Electrostatic dust collector. 4,147,522, Cl. 55-6.000.
Gontowski, Walter S., Jr., to Sprague Electric Company. Current-controlled oscillator. 4,147,996, Cl. 331-111.000.
Gonzalez-Dorner, Alberto C.: *See—*
Reischl, Artur; Jabs, Gert; and Gonzalez-Dorner, Alberto C., 4,147,680, Cl. 260-29.2TN.
Goodman, Richard M., to American Cyanamid Company. Process for scale control using mixtures of polycationic and polyanionic polymers. 4,147,627, Cl. 210-58.000.
Goodwin, Austin G.: *See—*
Clews, John C.; and Goodwin, Austin G., 4,147,913, Cl. 219-97.000.
Goodyear Tire & Rubber Company, The: *See—*
Duderstadt, John F.; Gresens, Henry L.; and Kolowski, Michael A., 4,147,751, Cl. 264-326.000.
Kline, Richard H., 4,147,880, Cl. 560-142.000.
Olsen, Richard J.; Brinkley, Max D.; and Thiele, John R., 4,147,482, Cl. 425-46.000.
Goranson, Paul L.: *See—*
Harvey, Samuel E.; Whitehead, James S.; and Goranson, Paul L., 4,147,264, Cl. 414-411.000.
Gorbunov, Boris N.: *See—*
Gokhberg, Pavel Y.; Gorbunov, Boris N.; Khardin, Alexandr P.; Rudkovsky, Vladimir L.; Belyaev, Valentin M.; Lukashov, Anatoly I.; Shpantseva, Ljudmila V.; and Orlyansky, Vitaly V., 4,147,736, Cl. 260-681.000.
Gordon, Frank E.: *See—*
Brooks, John D.; Humason, Harry W.; and Gordon, Frank E., 4,147,124, Cl. 114-321.000.
Gordos Corporation: *See—*
Lacis, Laimons; and Horvath, Steven, 4,148,000, Cl. 335-58.000.
Gore, Bertram W.; LaCosta, Nicholas J.; and Barr, Irwin R., to AAI Corporation. Warhead. 4,147,108, Cl. 102-67.000.
Gorgone, Robert L.; Iannadrea, Gerald; and Kovach, Alan J., to Ardac, Inc. Secondary detection system for security validation. 4,147,430, Cl. 356-51.000.
Gorkova, Nina S.: *See—*
Pomogailo, Anatoly D.; Lisitskaya, Alla P.; Oskin, Viktor S.; Dyachkovsky, Fridrikh S.; Ponomarev, Ardalion N.; and Gorkova, Nina S., 4,147,664, Cl. 252-429.00B.
Gorodissky, Leonid G.; Evtikhovich, Stanislav M.; Grigoriev, Igor P.; Kvashnin, Nikolai A.; Sokolov, Vladislav I.; Chekreneva, Larisa S.; Birdus, Rostislav G.; Zaitseva, Maria A.; Kryazhev, Jury T.; Kuzminova, Galina V.; and Romanov, Nikolai T., deceased (by Romanov, Anastasia T., administrator), to Bsesonuzny Nauchno-Issledovatelsky i Experimentalny Institut po Perabotke Khimicheskikh Volokon. Rubberized roll for the sealing device of a high pressure apparatus. 4,147,366, Cl. 277-22.000.
Goshima, Yoshitomo; Onoda, Shigeyoshi; Kawakubo, Kazuo; Hoshino, Osamu; Tsunoi, Haruo; and Iida, Noriyoshi, to Canon Kabushiki Kaisha. Fixing device. 4,147,501, Cl. 432-60.000.
Gostling, Peter E., to C. Evans & Sons Limited. Drop-head support assembly. 4,147,321, Cl. 248-354.00R.
Goswami, Jagadish C.; and Querido, Robert, to Stauffer Chemical Company. Internally plasticized vinyl chloride copolymer. 4,147,853, Cl. 526-278.000.
Gould Inc.: *See—*
Iwatsuki, Frank, 4,147,177, Cl. 137-504.000.
Graco Inc.: *See—*
Vork, William D., 4,147,478, Cl. 417-458.000.
Graphic Sciences, Inc.: *See—*
Costello, Matthew J.; Saunders, Thomas K.; and DeLuca, Albert M., 4,148,076, Cl. 358-286.000.

Grassaw, Inc.: *See*—
Valdespino, Joseph M., 4,147,018, Cl. 56-295.000.
Gray, Irwin. Home heating system control. 4,147,302, Cl. 237-9.00R.
Graybill, Robert W., to Farrier Industries, Inc. Pulverized coal burner for furnace and operating method. 4,147,116, Cl. 110263-.
Great Lakes Industries, Inc.: *See*—
Secor, Arthur D.; and Secor, Jerome G., 4,147,312, Cl. 242-72.00R.
Greathouse, William K., to Grumman Aerospace Corporation. Thrust reverser nozzle. 4,147,027, Cl. 60-226.00A.
Greaves, Alan J., to Post Office, The. Active filters utilizing networks of resistors and negative impedance converters. 4,147,997, Cl. 333-214.000.
Green, Carlos J.; and Hirsius, L. John, Jr. Cargo support. 4,147,112, Cl. 105-463.000.
Green Cross Corporation, The: *See*—
Naito, Ryoichi; Inahara, Hirohisa; and Shiino, Satoru, 4,147,779, Cl. 424-195.000.
Greene, Richard F.: *See*—
Haas, George A.; Greene, Richard F.; and Shih, Arnold, 4,147,515, Cl. 23-232.00E.
Greene, Ronald W.; and Marshall, John L. Transcutaneous pain control and/or muscle stimulating apparatus. 4,147,171, Cl. 128-421.000.
Greenwood, Ivan A., to Singer Company, The. Nuclear gyroscope with unequal fields. 4,147,974, Cl. 324-0.50F.
Greer Hydraulics, Inc.: *See*—
Baump, Paul A.; Lyu, Don; Sain, Jerry T.; and Zbriger, Richard A., 4,148,012, Cl. 340-149.00A.
Gregg, Richard, to Procter & Gamble Company, The. Method of and apparatus for making drip-type coffee. 4,147,097, Cl. 99-283.000.
Gresens, Henry L.: *See*—
Duderstadt, John F.; Gresens, Henry L.; and Kolowski, Michael A., 4,147,751, Cl. 264-326.000.
Grewe, Ferdinand: *See*—
Meiser, Werner; Buchel, Karl H.; Kramer, Wolfgang; and Grewe, Ferdinand, 4,147,791, Cl. 424-269.000.
Griffiths, John S.; and Stone, Roger N., to Sharon Electronics Limited. Densimeter. 4,147,051, Cl. 73-32.00R.
Grigoriev, Igor P.: *See*—
Gorodissky, Leonid G.; Evtikhovich, Stanislav M.; Grigoriev, Igor P.; Kvashnin, Nikolai A.; Sokolov, Vladislav I.; Chekreneva, Larisa S.; Birdus, Rostislav G.; Zaitseva, Maria A.; Kryazhev, Jury T.; Kuzminova, Galina V.; and Romanov, Nikolai T., deceased, 4,147,366, Cl. 277-22.000.
Grimmett, Howard L.: *See*—
Liu, Joseph; Grimmett, Howard L.; and Hwang, Yu-Tang, 4,147,849, Cl. 526-96.000.
Groeneweg, Willem H.: *See*—
Harwood, Leopold A.; Groeneweg, Willem H.; and Tuma, Alois V., 4,148,058, Cl. 358-24.000.
Grubbs, Robert H.: *See*—
Eickholt, Kathryn A.; and Grubbs, Robert H., 4,147,725, Cl. 260-578.000.
Grube, George. Chain saw mill. 4,146,962, Cl. 30-371.000.
Grumman Aerospace Corporation: *See*—
Greathouse, William K., 4,147,027, Cl. 60-226.00A.
Grun, Charles: *See*—
Solomon, Frank; and Grun, Charles, 4,147,839, Cl. 429-15.000.
Gryczka, Alfred J.; and Shah, Ramesh B., to Microlife Technics, Inc. Process for the treatment of meat with compositions including *Micrococcus varians* and a lactic acid producing bacteria. 4,147,807, Cl. 426-56.000.
Grzybowski, Steven: *See*—
Plaia, Lawrence; and Grzybowski, Steven, 4,146,946, Cl. 26-18.500.
GTE Laboratories Incorporated: *See*—
McKinzie, Howard; Lester, Joseph E.; and Palilla, Frank C., 4,147,763, Cl. 423-570.000.
Rhodes, William H., 4,147,744, Cl. 264-1.000.
GTE Sylvania Incorporated: *See*—
Haraden, Thomas, 4,147,497, Cl. 431-359.000.
Reed, Frederick F., 4,148,064, Cl. 358-118.000.
Schreurs, Willy P., 4,147,816, Cl. 427-67.000.
Webb, Edward A.; Makar, Francis B., Jr.; and Barakitis, Nikolaos, 4,147,952, Cl. 313-220.000.
Guarnieri, Charles R.: *See*—
Chevallier, Jacques P.; Guarnieri, Charles R.; Onton, Aare; and Wieder, Harold, 4,147,667, Cl. 252-501.000.
Gulf Research & Development Company: *See*—
Sabourin, Edward T.; and Barie, Walter P., Jr., 4,147,856, Cl. 528-92.000.
Schulz, Johann G. D.; and Sabourin, Edward T., 4,147,882, Cl. 562-410.000.
Gull Airborne Instruments, Inc.: *See*—
Rubel, Ira A.; Steiner, Herbert A.; and Ritter, Charles H., 4,147,050, Cl. 73-1.00H.
Gunter, Franz; and Eckhardt, Claude, to Ciba-Geigy Corporation. Brightening compositions. 4,147,648, Cl. 252-89.00B.
Gwozdz, Joseph W., to McKinney Manufacturing Company. Electric switch-concealing hinge. 4,148,001, Cl. 335-205.000.
Gyi, Ko Ko, to Burroughs Corporation. Flexible disk pack, related storage apparatus having disks with circumferential tab segments and associated partition means. 4,148,084, Cl. 360-98.000.
Gyuraki, Joseph P.: *See*—
Aranow, Harold B.; Gyuraki, Joseph P.; and Warenius, Robert E., 4,147,160, Cl. 128-2.00S.
H. H. Robertson Company: *See*—
Kautz, Glenn E., 4,147,002, Cl. 52-306.000.
Haas, George A.; Greene, Richard F.; and Shih, Arnold, to United States of America, Navy. Electro-chemical sensors for gas detection in electron tubes. 4,147,515, Cl. 23-232.00E.
Haas, Steven L.; Fonteneau, Norman O.; and Moore, Randall W., to Acushnet Company. Light emitter assembly. 4,148,096, Cl. 362-252.000.
Habarda, Pavol: *See*—
Rasman, Stefan; Hegedus, Pavol; and Habarda, Pavol, 4,147,075, Cl. 74-720.000.
Habegger, Millard A., to International Business Machines Corporation. Interferometric process and apparatus for the measurement of the etch rate of opaque surfaces. 4,147,435, Cl. 356-357.000.
Habu, Teiji; Nakajima, Tomio; Sakamoto, Eiichi; Fujimori, Noboru; and Mine, Kiyomitsu, to Konishiroku Photo Industry Co., Ltd. Silver halide photographic emulsions for use in flash exposure. 4,147,542, Cl. 96-27.00E.
Hagstrom, Staffan: *See*—
Carlsson, Erik; Pejchal, Karel; Fritzon, Hans G.; Hagstrom, Staffan; Kerff, Anton; and Wide, Lars, 4,147,187, Cl. 139-196.200.
Hakkinen, Allan K., to Oy Airam AB. Acid mixture for the electrolyte of a galvanic battery, and a method for producing said mixture. 4,147,843, Cl. 429-109.000.
Halcon Research and Development Corporation: *See*—
Leacock, James, 4,147,721, Cl. 562-532.000.
Halfacre, Dell V. Truck tire safety clamp. 4,147,195, Cl. 157-1.000.
Halgrimson, Darrell H.: *See*—
Artiano, Adrian; Halgrimson, Darrell H.; and Joselovitz, Henry W., 4,147,620, Cl. 209-590.000.
Hall, Dennis R., to Tektronix, Inc. Channel multiplier plate CRT scan converter and scan conversion method. 4,147,988, Cl. 323-124.000.
Hall, Howard T., Jr.: *See*—
Stringfellow, Gerald B.; and Hall, Howard T., Jr., 4,147,571, Cl. 148-175.000.
Hall, John B.: *See*—
Sprecker, Mark A.; Vock, Manfred H.; Schmitt, Frederick L.; Hall, John B.; and Sanders, James M., 4,147,727, Cl. 260-586.00R.
Hall, William E.; and Record, James G., to Shell Oil Company. Floating roof tank seal. 4,147,274, Cl. 220-226.000.
Hallot, Louis H.: *See*—
Lafont, Robert; and Hallot, Louis H., 4,147,334, Cl. 266-89.000.
Halma, Wayne; and Snyder, Dale. Heating system. 4,147,301, Cl. 237-8.00R.
Halpein, Alfred: *See*—
Kelly, William, deceased; Kelly, John, personal representative; and Halpein, Alfred, 4,147,776, Cl. 424-175.000.
Halpern, coexecutor, by Meyer: *See*—
Asculai, Samuel S.; Kupferberg, Alfred B., deceased; and Halpern, coexecutor, by Meyer, 4,147,803, Cl. 424-320.000.
Hamada, Masa: *See*—
Umezawa, Hamao; Takeuchi, Tomio; Hamada, Masa; Ishizuka, Masaaki; Naganawa, Hiroshi; Oki, Toshikazu; and Inui, Taiji, 4,147,778, Cl. 424-181.000.
Hamilton, Harry W.: *See*—
Rohner, Martin J.; Olszewsky, George; and Hamilton, Harry W., 4,146,967, Cl. 33-174.00C.
Hammond, Wayne S.: *See*—
Kelly, John D.; Hammond, Wayne S.; and Taylor, Gordon A., 4,148,032, Cl. 343-18.00A.
Han, Benjamin C. P.: *See*—
Preniczny, Robert B.; and Han, Benjamin C. P., 4,147,241, Cl. 188-264.00G.
Hankyu Zouki Kogyo Kabushiki Kaisha: *See*—
Kaji, Kunio; Azuma, Hideo; and Iwade, Kunio, 4,147,260, Cl. 414-98.000.
Hansen, Karl A.; and Hendrickson, Iver G., to Boeing Company, The. Electromagnetic force machine with universal portable power supply. 4,148,091, Cl. 361-156.000.
Hansen, Lloyd F., to American Cyanamid Company. Oral inhalator powder dispenser. 4,147,166, Cl. 128-266.000.
Hansen, Robert C.: *See*—
Engel, William K.; and Hansen, Robert C., 4,147,092, Cl. 91-490.000.
Hanzawa, Hisashi: *See*—
Tozune, Toshimasa; and Hanzawa, Hisashi, 4,147,898, Cl. 179-100.110.
Hara, Hideo: *See*—
Umeda, Haruhiko; Uenoyama, Masaru; Ishizuki, Kotoshige; and Hara, Hideo, 4,147,262, Cl. 414-687.000.
Hara, Yasuhiko: *See*—
Nakagawa, Kiyoshi; Toorisawa, Soichi; Ibe, Hiroyuki; Nakashima, Shigeaki; and Hara, Yasuhiko, 4,148,065, Cl. 358-101.000.
Hara, Yoshiaki: *See*—
Mori, Shigeo; Murakami, Fumikazu; Hara, Yoshiaki; Horikoshi, Ichiro; and Takahashi, Sohya, 4,147,899, Cl. 179-116.000.
Harada, Masanori: *See*—
Tanuma, Takeshi; and Harada, Masanori, 4,147,031, Cl. 60-278.000.
Harada, Setsuo, to Toyo Kogyo Co., Ltd. Engine acceleration detection apparatus. 4,147,143, Cl. 123-119.00A.
Haraden, Thomas, to GTE Sylvania Incorporated. Hand-operable signal device using percussively-ignitable flashlamps. 4,147,497, Cl. 431-359.000.
Harbert, Charles A.: *See*—
Althuis, Thomas H.; Harbert, Charles A.; Johnson, Michael R.; and Melvin, Lawrence S., Jr., 4,147,872, Cl. 546-216.000.
Harden, David R.; and Southerland, Hugh E., to Piedmont Wire Corporation. Apparatus for coiling wire. 4,147,310, Cl. 242-25.00A.

Harnisch, Horst; and Brack, Alfred, to Bayer Aktiengesellschaft. Benz-(C,D)-indolyl compounds. 4,147,865, Cl. 544-142.000.
Harris Corporation: *See—*
Smiley, Charles F.; and Weirather, Robert R., 4,148,069, Cl. 358-160.000.
Young, Eddie H. C., Jr.; and Yao, Shi-Kay, 4,146,955, Cl. 29-594.000.
Harrison, Norwood L.: *See—*
Baker, Clifford A.; and Harrison, Norwood L., 4,147,368, Cl. 277-182.000.
Harrison, Thomas S.; and Doyle, Ross L., to Sterling Drug, Inc. Underarm deodorant applicator. 4,147,441, Cl. 401-208.000.
Hart, Cornelis M.; and Lohstroh, Jan, to U.S. Philips Corporation. Method of manufacturing a semiconductor device and device manufactured by using the method. 4,148,054, Cl. 357-44.000.
Hartelius, Marshall V.: *See—*
Ames, Victor H.; and Hartelius, Marshall V., 4,147,238, Cl. 188-57.000.
Harting, Louis L.; and Kozlow, Michael R., to Carborundum Company, The. Thermal insulation assembly. 4,147,186, Cl. 138-155.000.
Harvey Hubbell Incorporated: *See—*
Gaetano, Mauro L.; and Skrovanek, Ambroz K., 4,147,900, Cl. 179-170.00R.
Harvey, Paul C.: *See—*
Walker, Gentle J., 4,147,131, Cl. 119-5.000.
Harvey, Samuel E.; Whitehead, James S.; and Goranson, Paul L., to Carrier Corporation. Apparatus for latching and unlatching refuse containers. 4,147,264, Cl. 414-411.000.
Harwood, Leopold A.; Groeneweg, Willem H.; and Tuma, Alois V., to RCA Corporation. PAL switching control circuit. 4,148,058, Cl. 358-24.000.
Harz, Peter: *See—*
Girguis, Sobhy; Krude, Werner; and Harz, Peter, 4,147,041, Cl. 64-17.00A.
Hasegawa, Gary K.: *See—*
Mascia, Carmen T.; and Hasegawa, Gary K., 4,147,283, Cl. 222-399.000.
Hashimoto, Hisao, to Iwatani Sangyo Kabushiki Kaisha. Swivelling water faucet. 4,147,181, Cl. 137-616.500.
Hashimoto, Masaoki: *See—*
Noguchi, Masamitsu; Komiyama, Yoshiro; and Hashimoto, Masaoki, 4,147,074, Cl. 74-559.000.
Haslam, Ivan S., to Haslam, Shirley B. Boat bow ladder assembly. 4,146,941, Cl. 9-1.600.
Haslam, Shirley B.: *See—*
Haslam, Ivan S., 4,146,941, Cl. 9-1.600.
Hass, Jurgen, to Daimler-Benz Aktiengesellschaft. Liquid-cooled internal combustion engine. 4,147,139, Cl. 123-41.540.
Hassler, Heinrich; and Kippenberg, Horst, to Siemens Aktiengesellschaft. Sintered composite material as contact material for medium-voltage vacuum power circuit breakers. 4,147,909, Cl. 200-265.000.
Hatfield, Hodge, to Alton Box Board Company. Paperboard tube concrete forms. 4,147,818, Cl. 427-133.000.
Hauck, Frederic P.; and Fox, Rita T., to E. R. Squibb & Sons, Inc. Cyclohexanetetrol derivatives. 4,147,871, Cl. 544-394.000.
Haug, Albert, to Societe d'Etudes de Machines Thermiques. Mushroom-type valve cooled by cooling fluid circulation. 4,147,138, Cl. 123-41.410.
Hauni Werke Koerber & Co. KG.: *See—*
Reuland, Joachim, 4,147,173, Cl. 131-21.00B.
Hauser, Raimund: *See—*
Vockenhuber, Karl, 4,148,072, Cl. 358-224.000.
Havranek, Jaroslav: *See—*
Balcar, Cestmir; Kostka, Antonin; Havranek, Jaroslav; and Lalak, Marcel, 4,147,616, Cl. 209-12.000.
Hawkins, Columbus W., Jr. Foldable harrow. 4,147,217, Cl. 172-662.000.
Hayami, Masaaki; and Torikoshi, Seiko, to Matsushita Electric Industrial Co., Ltd. Method of preparing styryl-like compounds. 4,147,862, Cl. 542-415.000.
Hayashi, Jun: *See—*
Sato, Akira; Ikeda, Tadashi; Sakai, Takeo; Takei, Haruo; and Hayashi, Jun, 4,147,553, Cl. 96-122.000.
Hayashi, Mikio: *See—*
Aoyagi, Masaya; Hayashi, Mikio; Yoshida, Yasuyuki; and Yao, Yoshiaki, 4,146,936, Cl. 3-1.910.
Hayashida, Yoshihiro, to Tokico Ltd. Fluid pressure servomotor. 4,147,091, Cl. 91-376.00R.
Hayes, Norman J.; and Bulloch, Andrew C., to Zoecon Corporation, a part interest. Animal identification tag application tool. 4,147,168, Cl. 128-330.000.
Haynen, Gilbert M. Lens holding means for light fixtures. 4,148,095, Cl. 362-223.000.
Haynes, Gardner S.: *See—*
Baboian, Robert; and Haynes, Gardner S., 4,147,596, Cl. 204-1.00T.
Heath Engineering Company: *See—*
Wirth, Jon C., 4,147,333, Cl. 266-48.000.
Heck, Klaus, to Audi-Nsu Auto Union Aktiengesellschaft Neckarsulm. Apparatus for hardening the cam tracks of camshafts for internal combustion engines. 4,147,335, Cl. 266-261.000.
Heckel, Klaus; Klaffke, Friedemann; and Umann, Walter, to Carl Freudenberg, Firma. Tumbling and exercise mat. 4,147,828, Cl. 428-255.000.
Heckethorn, John E., to Heckethorn Manufacturing Co. U-bolt clamp. 4,147,384, Cl. 285-382.200.
Heckethorn Manufacturing Co.: *See—*
Heckethorn, John E., 4,147,384, Cl. 285-382.200.
Heckles, John S.; and Miller, Norman L., to Armstrong Cork Company. Smoke-suppressant polymer compositions. 4,147,686, Cl. 260-31.80R.
Heckman, Richard C.; and Moss, Marvin, to United States of America, Energy. Fire resistant nuclear fuel cask. 4,147,938, Cl. 250-506.000.
Hedberg, Frederick L.: *See—*
Arnold, Fred E.; and Hedberg, Frederick L., 4,147,868, Cl. 544-353.000.
Heenan, Sidney A.; and Flanagan, Robert M., to Amerace Corporation. Snowplowable pavement marker and base member therefor. 4,147,447, Cl. 404-16.000.
Hegedus, Pavol: *See—*
Rasman, Stefan; Hegedus, Pavol; and Habarda, Pavol, 4,147,075, Cl. 74-720.000.
Heidelberger Druckmaschinen AG: *See—*
Becker, Willi, 4,147,105, Cl. 101-230.000.
Heil, Guenter: *See—*
Kuesters, Werner; Heil, Guenter; Fischer, Martin; Eisert, Manfred; and Kast, Hellmut, 4,147,604, Cl. 204-159.230.
Heilhecker, Joe K.: *See—*
Ilfrey, William T.; Heilhecker, Joe K.; and Maus, Leo D., 4,147,221, Cl. 175-7.000.
Heimdal, Ivar D.; and Skreosen, Ivar, to Norsk Hydro a.s. Method and system for transferring liquid media. 4,147,474, Cl. 417-54.000.
Heissenberger, Otto; Syrowatka, Rupert; and Tutschek, Ernst, to Maschinenfabrik Andritz Aktiengesellschaft. Press for dehydrating fibrous materials and other substances. 4,147,101, Cl. 100-118.000.
Held, Robert P., to Du Pont de Nemours, E. I., and Company. Lithographic printing plate having addition polymerized areas and binder areas. 4,147,549, Cl. 96-85.000.
Helena Laboratories Corporation: *See—*
Golias, Tipton L., 4,147,606, Cl. 204-180.00S.
Helfritch, Dennis J.: *See—*
Gonas, Edward J.; and Helfritch, Dennis J., 4,147,522, Cl. 55-6.000.
Helix International Limited: *See—*
Payton, Raymond A., 4,146,965, Cl. 33-27.00B.
Hell, Hans: *See—*
Thiel, Alfons W.; and Hell, Hans, 4,147,492, Cl. 425-394.000.
Helland, Arden R.: *See—*
Beydler, William W.; and Helland, Arden R., 4,147,940, Cl. 307-205.000.
Hemfort, Heinrich, to Westfalia Separator AG. Continuously operating solid-jacket counterflow centrifugal extractor. 4,147,293, Cl. 233-7.000.
Hendrickson, Iver G.: *See—*
Hansen, Karl A.; and Hendrickson, Iver G., 4,148,091, Cl. 361-156.000.
Hendrickson, Thomas E.; and Huang, Jack S. T., to Honeywell Inc. Semiconductor apparatus. 4,148,046, Cl. 357-23.000.
Hendrickson, Thomas E., to Honeywell Inc. Semiconductor apparatus. 4,148,047, Cl. 357-23.000.
Hendrix, Shelby D.: *See—*
Sprigg, E. Glenn; Couch, Everett O.; and Hendrix, Shelby D., 4,147,328, Cl. 254-89.00R.
Henry, Clemence J.: *See—*
Savoit, Robert E.; and Henry, Clemence J., 4,147,658, Cl. 252-384.000.
Henry, Thomas; and Youla, Jean, to Otis Elevator Company. Elevator control system. 4,147,235, Cl. 187-29.00R.
Hensel, Paul C., to Post Office, The. Dielectric optical waveguide joints. 4,147,404, Cl. 350-96.210.
Herb, Armin; and Schiefer, Erwin, to Hilti Aktiengesellschaft. Expansion dowel. 4,147,444, Cl. 403-313.000.
Herbert Zippel GmbH & Co.: *See—*
Zippel, Herbert, 4,147,257, Cl. 211-45.000.
Herbst, Donald. Device for reducing flue gas heat losses. 4,147,135, Cl. 122-412.000.
Herchenbach, Horst; and Schneider, Richard, to Klockner-Humboldt-Deutz AG. Grid cooler, particularly feed step grid cooler. 4,147,503, Cl. 432-78.000.
Herckelbout, Jacques. Machines for the manufacture of springs fitted with eyelets or hooks. 4,147,048, Cl. 72-137.000.
Herd, Alan J.: *See—*
Calder, Alan; and Herd, Alan J., 4,147,172, Cl. 131-2.000.
Hermann Windel GmbH & Co.: *See—*
Richter, Friedrich, 4,146,947, Cl. 26-104.000.
Herschler, Michael G.: *See—*
Shoop, John C.; Post, Roger L.; and Herschler, Michael G., 4,147,475, Cl. 417-310.000.
Hershberg, David E., to Satellite Transmission Systems, Inc. Apparatus for distributing television signal with stereophonic audio via satellite. 4,148,060, Cl. 358-83.000.
Herzig, Werner: *See—*
Reich, Kaspar, 4,147,378, Cl. 280-633.000.
Hetzel, Hartmut; Konig, Klaus; Schmelzer, Hans G.; and Wagner, Kuno, to Bayer Aktiengesellschaft. Process for the preparation of polyisocyanates which contain biuret groups. 4,147,714, Cl. 260-453.0AB.
Hetznecker, Frank W., to Honeywell Inc. Chemical smoke or pollutant detector. 4,148,022, Cl. 340-628.000.
Hewlett-Packard Company: *See—*
Gatzke, Ronald D., 4,147,162, Cl. 128-2.06B.
Sims, David J.; and Miracle, Billy D., 4,147,413, Cl. 350-253.000.

Stringfellow, Gerald B.; and Hall, Howard T., Jr., 4,147,571, Cl. 148-175.000.
Hickmann, Horst R.; and Albert, Roosevelt A., to Hickmann, Horst R. Ophthalmic prosthesis implant instrument. 4,147,167, Cl. 128-303.00R.
Hicks, John R., to Dupont Energy Management Corporation. System for monitoring electrical energy consumption. 4,147,978, Cl. 324-142.000.
Higgins, Raymond; and Hutchings, Graham J., to Imperial Chemical Industries Limited. Production of maleic anhydride and catalysts therefor. 4,147,661, Cl. 252-435.000.
Higgins, Thomas W.: *See—*
Breidt, Peter, Jr.; Higgins, Thomas W.; Nahmias, A. Michael; and Weiner, Milton L., 4,147,827, Cl. 428-218.000.
Higuchi, Katsuaki: *See—*
Tashiro, Yasunori; Yashiro, Takahiro; and Higuchi, Katsuaki, 4,147,014, Cl. 53-559.000.
Hildebrand, Karl J., to SpectraMetrics, Incorporated. Plasma jet device and method of operating same. 4,147,957, Cl. 315-111.200.
Hill, Horace E.: *See—*
Gaunt, Frank L.; Hill, Horace E.; and Soderberg, Mark S., 4,147,232, Cl. 184-1.00E.
Hilti Aktiengesellschaft: *See—*
Herb, Armin; and Schiefer, Erwin, 4,147,444, Cl. 403-313.000.
Hines, Vernon C. Flexible tubular device. 4,147,185, Cl. 138-121.000.
Hinton, Eddie Boyd. Glove for hobbling grip. 4,146,935, Cl. 2-161.00A.
Hirai, Kentaro; Fujishita, Toshio; Ishiba, Teruyuki; and Sugimoto, Hirohiko, to Shionogi & Co., Ltd. Triazolylbenzophenone derivatives and production thereof. 4,147,700, Cl. 260-308.00R.
Hiramatsu, Shuji: *See—*
Hukumoto, Yorio; Kashiwadani, Hiroshi; and Hiramatsu, Shuji, 4,147,819, Cl. 427-195.000.
Hirsius, L. John, Jr.: *See—*
Green, Carlos J.; and Hirsius, L. John, Jr., 4,147,112, Cl. 105-463.000.
Hitachi, Ltd.: *See—*
Iguchi, Masaru, 4,147,094, Cl. 92-48.000.
Koike, Norio; Takemoto, Iwao; and Kubo, Masaharu, 4,148,051, Cl. 357-30.000.
Matsunaga, Akira; and Suzuki, Kensuke, 4,148,056, Cl. 357-73.000.
Miki, Kazuyoshi, 4,147,591, Cl. 176-81.000.
Nakagawa, Kiyoshi; Toorisawa, Soichi; Ibe, Hiroyuki; Nakashima, Shigeaki; and Hara, Yasuhiko, 4,148,065, Cl. 358-101.000.
Takemoto, Iwao; Koike, Norio; and Kubo, Masaharu, 4,148,048, Cl. 357-30.000.
Terashima, Isamu, 4,147,127, Cl. 118-646.000.
Utamura, Motoaki; and Uchida, Shunsuke, 4,147,587, Cl. 176-19.0LD.
Hobart Corporation: *See—*
Fraula, Louis F.; and Athey, Stuart E., 4,147,558, Cl. 134-10.000.
Fraula, Louis F.; and Athey, Stuart E., 4,147,559, Cl. 134-57.00D.
Hobson, Donald E.: *See—*
Mazziotti, Philip J.; and Hobson, Donald E., 4,147,225, Cl. 180-44.00R.
Hoch, Paul E.: *See—*
Tilles, Harry; and Hoch, Paul E., 4,147,715, Cl. 260-455.00A.
Hochiki Corporation: *See—*
Watanabe, Masakatsu, 4,148,021, Cl. 340-531.000.
Hochstetter, Werner, to Siemens Aktiengesellschaft. Control circuit for an a-c control element. 4,147,972, Cl. 323-24.000.
Hodge, Lee R.; Crowell, John M.; and Rogers, Richard A., to Hughes Tool Company. Independently powered breakout apparatus and method for a sectional drill string. 4,147,215, Cl. 116-315.000.
Hodges, Joseph L.: *See—*
Wassmer, Norman B.; Anderson, Franklyn G.; and Hodges, Joseph L., 4,147,619, Cl. 209-565.000.
Hoebing, Richard F.; and Ledbetter, Robert L. Auxiliary cooling apparatus. 4,147,038, Cl. 62-180.000.
Hoechst Aktiengesellschaft: *See—*
Adrian, Renate; von Schenck, Raban; Cox, Bernd; and Wirtz, Peter, 4,147,758, Cl. 423-315.000.
Bathelt, Heinrich; Billenstein, Siegfried; and Schuierer, Erich, 4,147,743, Cl. 260-924.000.
Hoeh, Frederick W., deceased (by Hoeh, Inga, personal representative), to Westinghouse Electric Corp. Fluorescent lamp with integral thermal-insulating plastic jacket. 4,147,947, Cl. 313-27.000.
Hoeh, Inga, personal representative: *See—*
Hoeh, Frederick W., deceased, 4,147,947, Cl. 313-27.000.
Hoeksema, Joe H.: *See—*
Jensen, James K.; and Hoeksema, Joe H., 4,147,016, Cl. 56-15.800.
Hoffmann-La Roche Inc.: *See—*
Liebman, Arnold A.; and Liu, Yu-Ying, 4,147,703, Cl. 260-343.210.
Manchand, Percy S., 4,147,708, Cl. 260-413.000.
Walser, Armin; Fryer, Rodney I.; and Benjamin, Louis, 4,147,875, Cl. 548-302.000.
Wiederkehr, Hermann, 4,147,886, Cl. 568-824.000.
Hoffmeister, Elaine H.: *See—*
Anderson, Richard B.; Hoffmeister, Elaine H.; and Landholm, Richard A., 4,147,544, Cl. 96-29.00D.
Hofmann, Judson A., to Zenith Radio Corporation. Television synchronizing signal separating circuit. 4,148,068, Cl. 358-153.000.
Hohenberg, Gunter; and Kurr, Detlef, to Daimler-BenzAktiengesellschaft. Method and apparatus for determining the upper dead-center position with piston engines. 4,147,054, Cl. 73-117.300.
Hokkaido Soda Co., Ltd.: *See—*
Ikari, Yoshikatsu; Yokoyama, Shoichiro; Itaya, Ryutaro; and Ohkuma, Tsuneo, 4,147,665, Cl. 252-463.000.
Holbein, Robert D.: *See—*
Southern, Raymond L.; Benford, James G.; Petarra, Steve; Holbein, Robert D.; and Vince, Albert F., 4,147,506, Cl. 432-148.000.
Holland, Brian C., to Strewtex Fabrics Limited. Laminated material. 4,147,829, Cl. 428-311.000.
Hollingsworth, Frank H., to Standard Oil Company (Indiana). Combustion air injection well. 4,147,213, Cl. 166-256.000.
Holman, Harry A., Jr.: *See—*
Kallmeyer, Albert W.; and Holman, Harry A., Jr., 4,147,822, Cl. 428-35.000.
Holmes, Curtis F.; and Mueller, Max A., to Eleanor & Wilson Greatbatch Foundation. Lithium-bromine cell. 4,147,842, Cl. 429-101.000.
Holmes, Ralph A.: *See—*
Wertheimer, Donald J.; and Holmes, Ralph A., 4,146,943, Cl. 15-111.000.
Holmes, Wayne W., to Thiokol Corporation. Waste treatment system. 4,147,114, Cl. 110-221.000.
Holt, Lyn, to E M I Limited. Modulated groove records with a thick metal layer and method for making same. 4,148,067, Cl. 358-128.000.
Holz, Robert G.; Lesieux, Jean-Robert; and Pigot, Maurice R., to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation. Mounting for rotating machine on a drive shaft. 4,147,945, Cl. 310-115.000.
Holzl, Robert A., to Chemetal Corporation. Deposition method and products. 4,147,820, Cl. 427-248.00C.
Honda Giken Kogyo Kabushiki Kaisha: *See—*
Morita, Isamu; Inoue, Hidehiko; and Ohashi, Yasuo, 4,147,371, Cl. 280-276.000.
Honda, Toshio: *See—*
Tsujiuchi, Junpei; Honda, Toshio; and Okuda, Hiroshi, 4,147,052, Cl. 73-81.000.
Honeywell Inc.: *See—*
Chiang, Alice M.; and Butler, Neal R., 4,147,5o2, Cl. 136-213.000.
Hendrickson, Thomas E.; and Huang, Jack S. T., 4,148,046, Cl. 357-23.000.
Hendrickson, Thomas E., 4,148,047, Cl. 357-23.000.
Hetznecker, Frank W., 4,148,022, Cl. 340-628.000.
Spethmann, Donald H., 4,147,296, Cl. 236-1.00B.
Hooker Chemicals & Plastics Corp.: *See—*
Rutherford, John; and Eggers, Charles F., 4,147,600, Cl. 204-98.000.
Hopper, Thomas P. Device for cutting a cylindrical article. 4,146,959, Cl. 30-95.000.
Hopper, Thomas P., to Sunworks, Inc. Solar energy collector having a convection current inhibiting member. 4,147,156, Cl. 126-271.000.
Hora, Charles J.: *See—*
Babinsky, Andrew D.; and Hora, Charles J., 4,147,844, Cl. 521-27.000.
O'Leary, Kevin J.; Hora, Charles J.; and DeRespiris, Donald L., 4,147,599, Cl. 204-87.000.
Hori, Fumio. Method for obtaining Mg and Ca through carbon reduction. 4,147,534, Cl. 75-67.00R.
Horigome, Toshinori; and Kageyama, Takao, to Nippon Electric Co., Ltd. Wide-band coupled-cavity type traveling-wave tube. 4,147,956, Cl. 315-3.600.
Horikoshi, Ichiro: *See—*
Mori, Shigeo; Murakami, Fumikazu; Hara, Yoshiaki; Horikoshi, Ichiro; and Takahashi, Sohya, 4,147,899, Cl. 179-116.000.
Horimoto, Mitsuaki: *See—*
Shimomura, Masaichi; and Horimoto, Mitsuaki, 4,147,410, Cl. 350-184.000.
Horstmann, Winfried, to Robert Bosch GmbH. Correction of rapid periodic timing errors in the production of tape-recorded color television signals and the like. 4,148,079, Cl. 360-36.000.
Horvath, Frank P.: *See—*
Appleby, J. Robert; Horvath, Frank P.; and Morris, William J., deceased, 4,147,462, Cl. 408-80.000.
Horvath, Steven: *See—*
Lacis, Laimons; and Horvath, Steven, 4,148,000, Cl. 335-58.000.
Hoshino, Osamu: *See—*
Goshima, Yoshitomo; Onoda, Shigeyoshi; Kawakubo, Kazuo; Hoshino, Osamu; Tsunoi, Haruo; and Iida, Noriyoshi, 4,147,501, Cl. 432-60.000.
Hotard, Septime R. Carcass splitting machine. 4,146,945, Cl. 17-23.000.
Howa Sangyo Kabushiki Kaisha: *See—*
Ando, Tsuneo; and Nakajima, Hironori, 4,147,494, Cl. 431-71.000.
Howell, Stephen L.: *See—*
Robinson, John W.; and Howell, Stephen L., 4,147,085, Cl. 84-1.170.
Howlett, George H., to Howlett Machine Works. Method and apparatus for tensioning concrete reinforcing tendons. 4,146,951, Cl. 29-452.000.
Howlett Machine Works: *See—*
Howlett, George H., 4,146,951, Cl. 29-452.000.
Hozuma, Hiroshi: *See—*
Endo, Tomizo; Sumida, Yutaka; Kawahara, Toru; Ohtake, Masaichi; Motokawa, Shoichi; Nagayama, Keiji; Shigeta, Masatomo; Hozuma, Hiroshi; Tomizawa, Masaharu; and Kikuchi, Hideo, 4,147,753, Cl. 422-202.000.
Huang, Jack S. T.: *See—*
Hendrickson, Thomas E.; and Huang, Jack S. T., 4,148,046, Cl. 357-23.000.

Hubele, Adolf: *See—*
Kunz, Walter; Eckhardt, Wolfgang; and Hubele, Adolf, 4,147,792, Cl. 424-269.000.
Huber, Bernhard, to Bodenseewerk Perkin-Elmer & Co., GmbH. Method and apparatus for determining volatile and decomposable compounds by atomic absorption. 4,147,434, Cl. 356-312.000.
Hudson, Colin M.; and Andre, William L., to United States of America, Army. Impulse activated counting device. 4,146,987, Cl. 42-1.00E.
Huebner, Charles F., to Ciba-Geigy Corporation. 1-Indolylalkyl-3-or 4-trimethyleneurido-piperidines. 4,147,786, Cl. 424-251.000.
Hughes Aircraft Company: *See—*
Basiulis, Algerd, 4,147,206, Cl. 165-32.000.
Hughes Tool Company: *See—*
Hodge, Lee R.; Crowell, John M.; and Rogers, Richard A., 4,147,215, Cl. 116-315.000.
Hukumoto, Yorio; Kashiwadani, Hiroshi; and Hiramatsu, Shuji, to Sekisui Kagaku Kogyo Kabushiki Kaisha. Method for forming polyphenylene sulfide resin coating on the surface of metal substrate. 4,147,819, Cl. 427-195.000.
Huliganga, Ernie F.: *See—*
Wang, Samuel S.; Smith, Eugene L., Jr.; and Huliganga, Ernie F., 4,147,644, Cl. 252-61.000.
Humason, Harry W.: *See—*
Brooks, John D.; Humason, Harry W.; and Gordon, Frank E., 4,147,124, Cl. 114-321.000.
Humes Limited: *See—*
Baker, Clifford A.; and Harrison, Norwood L., 4,147,368, Cl. 277-182.000.
Hunt, Larry L. Spray drawbar. 4,147,305, Cl. 239-167.000.
Hurt, William S., to Rohm and Haas Company. O,s-dialkyl o-benzamidophenyl phosphorothiolates and phosphorodithioates and pesticidal methods. 4,147,781, Cl. 424-211.000.
Hurtes, Walter. Manufacture of nonwoven pile articles. 4,147,575, Cl. 156-72.000.
Hutcheson, Daniel M.: *See—*
Day, Stephen W.; and Hutcheson, Daniel M., 4,147,004, Cl. 52-309.900.
Hutchings, Graham J.: *See—*
Higgins, Raymond; and Hutchings, Graham J., 4,147,661, Cl. 252-435.000.
Hutton, Thomas W.; and Rogers, Pamela J., to Rohm and Haas Company. Process for increasing molecular weight of a polymer. 4,147,850, Cl. 526-207.000.
Hwang, Yu-Tang: *See—*
Liu, Joseph; Grimmett, Howard L.; and Hwang, Yu-Tang, 4,147,849, Cl. 526-96.000.
Hyde, Phillip R.; and Lewis, Samuel J. Acrobatic amusement device. 4,147,343, Cl. 272-33.00B.
HydReclaim Corporation: *See—*
Moller, Richard W., 4,148,100, Cl. 366-150.000.
Hydroacoustics Inc.: *See—*
Bouyoucos, John V., 4,147,228, Cl. 181-119.000.
Iannadrea, Gerald: *See—*
Gorgone, Robert L.; Iannadrea, Gerald; and Kovach, Alan J., 4,147,430, Cl. 356-51.000.
Iantorno, James, to Sealectro Corporation. Electrical assembly in combination with printed circuit board. 4,147,397, Cl. 339-17.00C.
Ibe, Hiroyuki: *See—*
Nakagawa, Kiyoshi; Toorisawa, Soichi; Ibe, Hiroyuki; Nakashima, Shigeaki; and Hara, Yasuhiko, 4,148,065, Cl. 358-101.000.
Ichikawa, Singo, to Citizen Watch Company Limited. Electronic timepiece. 4,147,022, Cl. 58-35.00W.
ICI Americas Inc.: *See—*
Rutledge, Thomas F., 4,147,663, Cl. 252-428.000.
IDR, Inc.: *See—*
Saylor, Richard, 4,148,066, Cl. 358-127.000.
Igarashi, Akira: *See—*
Kato, Hajime; Igarashi, Akira; Matsukawa, Hiroharu; and Miyamoto, Akio, 4,147,830, Cl. 428-324.000.
Igarashi, Ryuji: *See—*
Shohata, Nobuaki; Ohno, Tomeji; Ikeda, Shigeru; Fukushima, Takaki; Igarashi, Ryuji; and Yoshida, Jyun-Ichiro, 4,147,670, Cl. 252-519.000.
Iguchi, Masaru, to Hitachi, Ltd. Vacuum operated device. 4,147,094, Cl. 92-48.000.
Ihle, Josef, to Irma Ungerer Geb. Dollinger. Apparatus for handling strip. 4,147,079, Cl. 83-170.000.
Iida, Noriyoshi: *See—*
Goshima, Yoshitomo; Onoda, Shigeyoshi; Kawakubo, Kazuo; Hoshino, Osamu; Tsunoi, Haruo; and Iida, Noriyoshi, 4,147,501, Cl. 432-60.000.
Iijima, Isamu: *See—*
Yada, Akira; Iijima, Isamu; Itakura, Jo; and Fujikura, Saburo, 4,147,682, Cl. 260-29.6SQ.
Ijichi, Sadayoshi; and Shimada, Yasutaka, to Alps Electric Co., Ltd. Automatic gain control apparatus. 4,147,991, Cl. 330-284.000.
Ikari, Yoshikatsu; Yokoyama, Shoichiro; Itaya, Ryutaro; and Ohkuma, Tsuneo, to Agency of Industrial Science & Technology; and Hokkaido Soda Co., Ltd. Magnesia adsorbent. 4,147,665, Cl. 252-463.000.
Ikebe, Jun; Kumagai, Yoriaki; Takakura, Kintomo; and Ohta, Michio, to Clinical Engineering Laboratory Limited. Intracranial pressure monitoring method and system. 4,147,161, Cl. 128-2.00R.
Ikeda, Nasaki: *See—*
Nishino, Atsushi; Sonetaka, Kazunori; Kimura, Kunio; and Ikeda, Nasaki, 4,147,835, Cl. 428-450.000.
Ikeda, Shigeru: *See—*
Shohata, Nobuaki; Ohno, Tomeji; Ikeda, Shigeru; Fukushima, Takaki; Igarashi, Ryuji; and Yoshida, Jyun-Ichiro, 4,147,670, Cl. 252-519.000.
Ikeda, Tadashi: *See—*
Sato, Akira; Ikeda, Tadashi; Sakai, Takeo; Takei, Haruo; and Hayashi, Jun, 4,147,553, Cl. 96-122.000.
Ilfrey, William T.; Heilhecker, Joe K.; and Maus, Leo D., to Exxon Production Research Company. Riser set-aside system. 4,147,221, Cl. 175-7.000.
Ilnyckyj, Stephen, to Exxon Research & Engineering Co. Combinations of oil-soluble aliphatic copolymers with nitrogen derivatives of hydrocarbon substituted succinic acids are flow improvers for middle distillate fuel oils. 4,147,520, Cl. 44-62.000.
Imamura, Eigo, to Sanyo Electric Co., Ltd. Superheterodyne receiver of scanning type. 4,147,987, Cl. 325-455.000.
Imatt, Alex, to Marvin Glass & Associates. Game apparatus. 4,147,361, Cl. 273-271.000.
Imperial Chemical Industries Limited: *See—*
Bostock, Stephen B.; Renfrew, Andrew H. M.; and Cartwright, Geoffrey H., 4,147,510, Cl. 8-39.00C.
Brock, Michael; and Cooke, Brian A., 4,147,567, Cl. 148-6.15Z.
Calder, Alan; and Herd, Alan J., 4,147,172, Cl. 131-2.000.
Gilbert, Arthur H., 4,147,883, Cl. 562-523.000.
Higgins, Raymond; and Hutchings, Graham J., 4,147,661, Cl. 252-435.000.
Riggs, Aubrey F., 4,147,126, Cl. 118-227.000.
Shephard, Margaret C.; and Worthington, Paul A., 4,147,793, Cl. 424-269.000.
Imperial Oil Enterprises Ltd.: *See—*
Miasek, Peter G.; and Dugan, John J., 4,147,611, Cl. 208-108.000.
Miasek, Peter G.; and Dugan, John J., 4,147,612, Cl. 208-108.000.
Ina, Toshikazu: *See—*
Kawai, Hisasi; and Ina, Toshikazu, 4,148,090, Cl. 361-152.000.
Inahara, Hirohisa: *See—*
Naito, Ryoichi; Inahara, Hirohisa; and Shiino, Satoru, 4,147,779, Cl. 424-195.000.
Indikon Company, Inc., The: *See—*
Finn, Albert E.; and Ginns, Haskell, 4,148,013, Cl. 340-189.00M.
Industrial Designs & Services: *See—*
Crane, Walton B., 4,147,289, Cl. 229-23.00R.
Ing C. Olivetti C., S.p.A.: *See—*
Sandrone, Bruno; Nuccio, Giuseppe; and Gilardi, Emilio, 4,147,438, Cl. 400-144.200.
Inmektor KY: *See—*
Persson, Agne C., 4,147,099, Cl. 99-636.000.
Inoue, Hidehiko: *See—*
Morita, Isamu; Inoue, Hidehiko; and Ohashi, Yasuo, 4,147,371, Cl. 280-276.000.
INRECO AB: *See—*
Akerblom, Ake, 4,147,182, Cl. 137-625.170.
Institut Francais du Petrole: *See—*
Rabilloud, Guy; and Sillion, Bernard, 4,147,728, Cl. 260-590.00D.
Institut Straumann AG: *See—*
Marechal, Pierre, 4,147,568, Cl. 148-32.500.
Institute of Gas Technology: *See—*
Klass, Donald L., 4,147,456, Cl. 405-210.000.
Interior Wood Products, Inc.: *See—*
Day, Dallas C., 4,146,954, Cl. 29-467.000.
Interliz Anstalt: *See—*
Vogt, Alfred; and Kunkel, Wolfgang, 4,147,134, Cl. 122-5.000.
International Business Machines Corporation: *See—*
Ahearn, William E.; and Park, Kyu C., 4,147,958, Cl. 315-169.400.
Chevallier, Jacques P.; Guarnieri, Charles R.; Onton, Aare; and Wieder, Harold, 4,147,667, Cl. 252-501.000.
Fang, Frank F.; and Shih, Kwang K., 4,148,045, Cl. 357-17.000.
Freeman, Marshall E., 4,147,299, Cl. 236-49.000.
Habegger, Millard A., 4,147,435, Cl. 356-357.000.
Munzel, Howard E.; and Queener, Carl A., 4,147,834, Cl. 428-407.000.
International Flavors & Fragrances Inc.: *See—*
Sprecker, Mark A.; Vock, Manfred H.; Schmitt, Frederick L.; Hall, John B.; and Sanders, James M., 4,147,727, Cl. 260-586.00R.
International Glass Equipment Co.: *See—*
Tourres, Francois G., 4,147,249, Cl. 198-459.000.
International Nickel Company, Inc., The: *See—*
Borner, William G.; Dill, Aloys J.; and Fisher, Gordon L., 4,147,597, Cl. 204-12.000.
International Standard Electric Corporation: *See—*
Chown, Martin, 4,147,402, Cl. 350-96.180.
International Telephone & Telegraph Corp.: *See—*
Natalizia, Angelo, 4,147,326, Cl. 251-162.000.
Sawyer, Edgar W., Jr., 4,147,519, Cl. 44-51.000.
International Tool and Supply Co. Inc.: *See—*
Blattler, Joe F., 4,147,046, Cl. 72-68.000.
Internationale Octrooi Maatschappij Octropa B.V.: *See—*
Sein, Anton J.; Reitberg, Johan; and Schouten, Johan M., 4,147,737, Cl. 260-835.000.
Interx Research Corporation: *See—*
Shaffer, Richard D.; and Windheuser, John J., 4,147,768, Cl. 424-35.000.
Inui, Taiji: *See—*
Umezawa, Hamao; Takeuchi, Tomio; Hamada, Masa; Ishizuka, Masaaki; Naganawa, Hiroshi; Oki, Toshikazu; and Inui, Taiji, 4,147,778, Cl. 424-181.000.

Inverni Della Beffa S.p.A.: *See—*
Mustich, Giuseppe, 4,147,777, Cl. 424-181.000.
Irma Ungerer Geb. Dollinger: *See—*
Ihle, Josef, 4,147,079, Cl. 83-170.000.
Ishiba, Teruyuki: *See—*
Hirai, Kentaro; Fujishita, Toshio; Ishiba, Teruyuki; and Sugimoto, Hirohiko, 4,147,700, Cl. 260-308.00R.
Ishida, Yasuhiko: *See—*
Katahira, Eturou; Yamaguchi, Shunzo; Kida, Masashi; and Ishida, Yasuhiko, 4,147,030, Cl. 60-276.000.
Ishihara, Osamu: *See—*
Yamawaki, Masao; Aoki, Katsuo; Oka, Yoshio; Suzuki, Takao; Amano, Masahiko; Ozaki, Hideki; and Ishihara, Osamu, 4,147,432, Cl. 118-49.100.
Ishikawa, Kazushige: *See—*
Kurata, Junichi; Ishikawa, Kazushige; and Nagashima, Nozomu, 4,147,365, Cl. 274-9.0RA.
Ishikawajima-Harima Jukogyo Kabushiki Kaisha: *See—*
Yasukawa, Shozo; and Matsuda, Kenji, 4,147,887, Cl. 13-18.00B.
Ishizuka, Hiroshi. Process for synthesizing diamonds. 4,147,255, Cl. 206-525.000.
Ishizuka, Hisai: *See—*
Kawakami, Sigezo; Tsuji, Kunihiko; Omura, Hiroshi; and Ishizuka, Hisai, 4,147,505, Cl. 432-118.000.
Ishizuka, Masaaki: *See—*
Umezawa, Hamao; Takeuchi, Tomio; Hamada, Masa; Ishizuka, Masaaki; Naganawa, Hiroshi; Oki, Toshikazu; and Inui, Taiji, 4,147,778, Cl. 424-181.000.
Ishizuki, Kotoshige: *See—*
Umeda, Haruhiko; Uenoyama, Masaru; Ishizuki, Kotoshige; and Hara, Hideo, 4,147,262, Cl. 414-687.000.
Itakura, Jo: *See—*
Yada, Akira; Iijima, Isamu; Itakura, Jo; and Fujikura, Saburo, 4,147,682, Cl. 260-29.6SQ.
Itaya, Ryutaro: *See—*
Ikari, Yoshikatsu; Yokoyama, Shoichiro; Itaya, Ryutaro; and Ohkuma, Tsuneo, 4,147,665, Cl. 252-463.000.
Itek Corporation: *See—*
Aldrich, Ralph E.; Cumming, William J.; and Simmons, William A., Jr., 4,147,656, Cl. 252-299.000.
Foster, L. Curtis; and Lindley, John P., 4,147,424, Cl. 356-352.000.
Ito, Masami; Saito, Tsutomu; and Morita, Yoshiyuki, to Toyota Jidosha Kogyo Kabushiki Kaisha; and Nippon Denso Company Limited. Fuel control apparatus for a diesel engine. 4,147,148, Cl. 123-179.00L.
Ito, Mikiji: *See—*
Miura, Motohisa; and Ito, Mikiji, 4,147,033, Cl. 60-290.000.
Itoh, Shigemasa: *See—*
Koitabashi, Takeo; Fujimori, Noboru; and Itoh, Shigemasa, 4,147,547, Cl. 96-74.000.
ITT Industries, Inc.: *See—*
Steffen, Hermann; and Weiler, Rolf, 4,147,236, Cl. 188-1.00A.
Ivanov, Jury I.: *See—*
Pronko, Vladimir G.; Onosovsky, Evgeny V.; Chuvpilo, Albert V.; Zhuravleva, Irina N.; Korneev, Viktor A.; Klimenkov, Dmitry A.; Smirnova, Galina M.; Usanov, Vladimir V.; Ivanov, Jury I.; Chernyshev, Boris A.; Nikitkin, Vasily D.; Nikolaev, Anatoly F.; Trizno, Maya S.; Karkozov, Valery G.; Verkhoglyadova, Tatyana J.; Moskalev, Evgeny V.; and Yakovleva, Lidia I., 4,147,210, Cl. 165-165.000.
Iwade, Kunio: *See—*
Kaji, Kunio; Azuma, Hideo; and Iwade, Kunio, 4,147,260, Cl. 414-98.000.
Iwano, Haruhiko: *See—*
Kubotera, Kikuo; Mizuki, Eiichi; Satomura, Masato; Iwano, Haruhiko; and Fujiwara, Tadahiro, 4,147,543, Cl. 96-29.00R.
Shimamura, Isao; and Iwano, Haruhiko, 4,147,546, Cl. 96-60.00R.
Iwase, Keizo; Takada, Toshio; and Bando, Yoshichika, to Matsushita Electric Industrial Co., Ltd. Method of making a polycrystalline Mn containing ferrite body. 4,147,747, Cl. 264-65.000.
Iwata, Hiroshi; and Yamaoka, Tetsuo, to West Electric Company, Ltd. Flash camera. 4,147,420, Cl. 354-127.000.
Iwatani Sangyo Kabushiki Kaisha: *See—*
Hashimoto, Hisao, 4,147,181, Cl. 137-616.500.
Iwatsuki, Frank, to Gould Inc. Flow regulator. 4,147,177, Cl. 137-504.000.
Izumo, Masanori, to Daikin Kogyo Co., Ltd. Apparatus for continuously treating gas with activated carbon. 4,147,523, Cl. 55-208.000.
Izzi, Lewis B. Drain fitting for pre-formed or pre-assembled showers, etc. 4,146,939, Cl. 4-286.000.
J. I. Case Company: *See—*
Dunn, Donnell L., 4,147,093, Cl. 91-510.000.
J. M. Huber Corporation: *See—*
Oder, Robin R., 4,147,632, Cl. 210-222.000.
J. R. Schneider Co., Inc.: *See—*
Crowe, William D., 4,147,635, Cl. 210-401.000.
Jabs, Gert: *See—*
Reischl, Artur; Jabs, Gert; and Gonzalez-Dorner, Alberto C., 4,147,680, Cl. 260-29.2TN.
Jacobi, John H.: *See—*
Larsen, Lawrence E.; and Jacobi, John H., 4,148,005, Cl. 338-28.000.
Jacobs, John D. Directional concentrated air discharge outlet. 4,147,095, Cl. 98-40.0VM.
Jacques, Andre: *See—*
d'Auria, Luigi; Jacques, Andre; and Moronvalle, Chantal, 4,147,403, Cl. 350-96.180.
Jaeger, Ben E. Liquid sampler. 4,147,062, Cl. 73-422.0GC.
Jahnle, Herbert A., to Budd Company, The. Mechanical press for molding plastic parts. 4,147,486, Cl. 425-157.000.
Janssen, Harald, to Beck & Co. AG. Process for insulating electrical conductors with heat-resistant resins. 4,147,817, Cl. 427-118.000.
Janssen, Klaus-Uwe: *See—*
Lather, Dieter; Janssen, Klaus-Uwe; Ries, Karl; Moller, Peter; and Forstermann, Ulrich, 4,147,065, Cl. 73-611.000.
Japan Synthetic Rubber Co. Ltd.: *See—*
Arakawa, Masatoshi; Yamanouchi, Haruo; Okumura, Taro; and Yoshida, Teruo, 4,147,848, Cl. 526-77.000.
Japikse, Cornelis H.: *See—*
Liepa, Alexander L.; and Japikse, Cornelis H., 4,147,808, Cl. 426-477.000.
Jarnefelt, Johan: *See—*
Suovaniemi, Osmo A.; Ekholm, Pertti; Suni, Jukka; and Jarnefelt, Johan, 4,147,752, Cl. 422-57.000.
Jarry, Jean, to Compagnie Generale des Etablissements Michelin. Apparatus for cutting circumferential grooves in the tread of a tire. 4,147,196, Cl. 157-13.000.
Jayne, Gerald J. J.; Woods, David R.; and O'Brien, Joseph P., to Edwin Cooper and Company Limited. Lubricant composition. 4,147,640, Cl. 252-45.000.
Jeffery, Brian S., to South African Inventions Development Corporation, The. Method of operating a compaction roller assembly, and a compaction roller assembly. 4,147,448, Cl. 404-124.000.
Jeffes Engineering Limited: *See—*
Jeffes, Robert H. F., 4,147,374, Cl. 280-478.00R.
Jeffes, Robert H. F., to Jeffes Engineering Limited. Drawbar. 4,147,374, Cl. 280-478.00R.
Jeghers, Philippe M., to Fabrique Nationale Herstal S.A. Set of golf clubs. 4,147,349, Cl. 273-77.00A.
Jelmorini, Gerardus, to U.S. Philips Corporation. Method and device for plasma-MIG-welding. 4,147,917, Cl. 219-121.00P.
JENAer Glaswerk Schott & Gen.: *See—*
Mueller, Gerd, 4,147,951, Cl. 313-220.000.
Jenkins, Barry R.; Roberts, Waldo C.; and Roberts, Frank W., to Jenkins, Barry R. Conditioned-air suit and system. 4,146,933, Cl. 2-2.000.
Jenko, Branko: *See—*
Zupancic, Boris; and Jenko, Branko, 4,147,729, Cl. 260-591.000.
Jensen, James K.; and Hoeksema, Joe H., to Deere & Company. Harvester having height adjustable head. 4,147,016, Cl. 56-15.800.
Jerinic, George: *See—*
Thoren, Glenn R.; Lampen, James L.; and Jerinic, George, 4,147,994, Cl. 331-56.000.
Jess, Thurman S., to Baxter Travenol Laboratories, Inc. Adjustable valve. 4,147,184, Cl. 137-625.470.
Jesse, William L. M., to Solution Sciences, Inc. Direct laser printing and forming apparatus. 4,148,057, Cl. 358-4.000.
Jochen Plen, KG: *See—*
Plenk, Hans-Joachim, 4,147,377, Cl. 280-609.000.
Johnson, Alexander L.: *See—*
Farnham, William B.; and Johnson, Alexander L., 4,147,860, Cl. 536-4.000.
Johnson, Gordon E.: *See—*
Lindblad, Nero R.; Johnson, Gordon E.; and Sharp, James H., 4,147,541, Cl. 96-1.500.
Johnson, Howard L., to Caterpillar Tractor Co. Hydraulic system with priority control. 4,147,034, Cl. 60-422.000.
Johnson & Johnson: *See—*
Balinth, Ivan J., 4,147,831, Cl. 428-356.000.
Johnson, Leonard L., to TECO, Inc. Position responsive valve for controlling the retraction rate of a lower boom in an articulated boom assembly. 4,146,998, Cl. 52-115.000.
Johnson, Michael R.: *See—*
Althuis, Thomas H.; Harbert, Charles A.; Johnson, Michael R.; and Melvin, Lawrence S., Jr., 4,147,872, Cl. 546-216.000.
Johnson, Thomas E., to Eaton Corporation. Traveling hose system. 4,147,194, Cl. 144-309.0AC.
Jones, Norman R.: *See—*
Davis, Oliver T.; and Jones, Norman R., 4,147,923, Cl. 219-368.000.
Jones, Stanley C.: *See—*
Plummer, Mark A.; and Jones, Stanley C., 4,147,637, Cl. 252-8.55D.
Jonqueres, Pierre, to Procedes SEM. Mixer blade. 4,147,437, Cl. 366-343.000.
Jordan, Kenneth A., to Trip Lite Ltd. Tape/capstan feed unit. 4,147,311, Cl. 242-47.010.
Jordan, William D., Jr., to Canoga Controls Corporation. Retainer device means for hinging or removably attaching a cover to a chassis. 4,147,276, Cl. 220-323.000.
Josef Haamann, Firma: *See—*
Mai, Erich, 4,147,267, Cl. 414-498.000.
Joselovitz, Henry W.: *See—*
Artiano, Adrian; Halgrimson, Darrell H.; and Joselovitz, Henry W., 4,147,620, Cl. 209-590.000.
Jossel, Franklin: *See—*
Mammino, Joseph; and Jossel, Franklin, 4,147,540, Cl. 96-1.200.
Juliano, Peter C.: *See—*
Swiger, Roger T.; and Juliano, Peter C., 4,147,740, Cl. 260-878.00R.
Jung, Michel: *See—*
Metcalf, Brian W.; and Jung, Michel, 4,147,873, Cl. 546-221.000.
Jutle, Hans: *See—*
Unger, Eberhart; Jutle, Hans; and Stuckmann, Dieter, 4,147,453, Cl. 405-141.000.

Kabs, Klaus: *See*—
Gaenzler, Wolfgang; Kabs, Klaus; and Schroeder, Guenter, 4,147,718, Cl. 260-465.900.
Kabushiki Kaisha Daini Seikosha: *See*—
Kondo, Kenichi, 4,147,021, Cl. 58-16.00D.
Mori, Shigeo; Murakami, Fumikazu; Hara, Yoshiaki; Horikoshi, Ichiro; and Takahashi, Sohya, 4,147,899, Cl. 179-116.000.
Tsujiuchi, Junpei; Honda, Toshio; and Okuda, Hiroshi, 4,147,052, Cl. 73-81.000.
Kabushiki Kaisha Komatsu Seisakusho: *See*—
Umeda, Haruhiko; Uenoyama, Masaru; Ishizuki, Kotoshige; and Hara, Hideo, 4,147,262, Cl. 414-687.000.
Yatsurugi, Yoshifumi; Yusa, Atsushi; and Takahashi, Nagao, 4,147,814, Cl. 472-51.000.
Kageyama, Takao: *See*—
Horigome, Toshinori; and Kageyama, Takao, 4,147,956, Cl. 315-3.600.
Kahle, Rolf D.; and Meadows, John W., to Quantor Corporation. Method and apparatus for evacuating aqueous ammonia vapor from film developing chambers. 4,147,422, Cl. 354-299.000.
Kain, Per; Lockley, Robert; and Valis, Jaroslav, to ASEA AB. Means for digital control. 4,147,966, Cl. 318-327.000.
Kaji, Kunio; Azuma, Hideo; and Iwade, Kunio, to Hankyu Zouki Kogyo Kabushiki Kaisha. Apparatus collecting pipes and the like. 4,147,260, Cl. 414-98.000.
Kalbas, Berthold. Bathing cap. 4,146,932, Cl. 2-68.000.
Kaldun, Mark R.: *See*—
Miller, Curtis H.; Kaldun, Mark R.; and Arp, Robert A., 4,147,969, Cl. 320-2.000.
Kaleta, Donald J. Snake skin mounting. 4,147,826, Cl. 428-151.000.
Kalfoglou, George, to Texaco Inc. Tannin materials as additives in oil recovery processes involving chemical recovery agents. 4,147,214, Cl. 166-273.000.
Kallmeyer, Albert W.; and Holman, Harry A., Jr., to McDonnell Douglas Corporation. Composite structure and process and apparatus for making the same. 4,147,822, Cl. 428-35.000.
Kalsi, Manmohan S., to ACF Industries, Incorporated. Valve using rolamite mechanism. 4,147,183, Cl. 137-625.280.
Kamada, Masahiro; and Mimura, Masataka, to Daiichi Seiyaku Co., Ltd. Easily hydrolyzable esters of 4-(2-carboxyethyl)phenyl trans-4-aminomethylcyclohexanecarboxylate and process of use. 4,147,876, Cl. 560-37.000.
Kambara, Masahiro: *See*—
Okada, Hidehiko; Morio, Minoru; Kambara, Masahiro; and Kubota, Yukio, 4,148,082, Cl. 360-77.000.
Kamin, Gerhard, to Robert Bosch GmbH. Television-based alarm system. 4,148,062, Cl. 358-105.000.
Kammerhofer, Klaus: *See*—
Vogl, Ernst; and Kammerhofer, Klaus, 4,147,532, Cl. 75-52.000.
Kaneda, Kazuyoshi: *See*—
Shigeta, Fumio; and Kaneda, Kazuyoshi, 4,147,598, Cl. 204-35.00N.
Kaniecki, Thaddeus J., to Stauffer Chemical Company. Liquid cleaning concentrate. 4,147,652, Cl. 252-156.000.
Kansai Netsukagaku Kabushiki Kaisha: *See*—
Masuda, Yukio; and Naoi, Hiroshi, 4,147,595, Cl. 202-241.000.
Kao, Jar-Lin: *See*—
Sheng, Ming N.; and Kao, Jar-Lin, 4,147,884, Cl. 562-533.000.
Kaplan, Irving L., to Carl Krasny & Associates, Inc. Transfer for elongated articles having optional rolling restraint. 4,147,258, Cl. 414-680.000.
Karino, Yukio; and Nakamura, Taku, to Fuji Photo Film Co., Ltd. Photographic element comprising quaternary nitrogen polymeric mordant. 4,147,548, Cl. 96-77.000.
Karkozov, Valery G.: *See*—
Pronko, Vladimir G.; Onosovsky, Evgeny V.; Chuvpilo, Albert V.; Zhuravleva, Irina N.; Korneev, Viktor A.; Klimenkov, Dmitry A.; Smirnova, Galina M.; Usanov, Vladimir V.; Ivanov, Jury I.; Chernyshev, Boris A.; Nikitkin, Vasily D.; Nikolaev, Anatoly F.; Trizno, Maya S.; Karkozov, Valery G.; Verkhoglyadova, Tatyana J.; Moskalev, Evgeny V.; and Yakovleva, Lidia I., 4,147,210, Cl. 165-165.000.
Karl Deutsch Pruf-und Messgeratebau: *See*—
Lather, Dieter; Janssen, Klaus-Uwe; Ries, Karl; Moller, Peter; and Forstermann, Ulrich, 4,147,065, Cl. 73-611.000.
Karlsoen, Harald, to Elkem-Spigerverket A/S. System for continuous analysis of gasses. 4,147,500, Cl. 432-2.000.
Kashiwadani, Hiroshi: *See*—
Hukumoto, Yorio; Kashiwadani, Hiroshi; and Hiramatsu, Shuji, 4,147,819, Cl. 427-195.000.
Kassahn, Horst-Gunter: *See*—
Alewelt, Wolfgang; Margotte, Dieter; Vernaleken, Hugo; and Kassahn, Horst-Gunter, 4,147,707, Cl. 260-37.0SB.
Kast, Hellmut: *See*—
Kuesters, Werner; Heil, Guenter; Fischer, Martin; Eisert, Manfred; and Kast, Hellmut, 4,147,604, Cl. 204-159.230.
Kasuya, Yutaka: *See*—
Obase, Hiroyuki; and Kasuya, Yutaka, 4,147,799, Cl. 424-282.000.
Katahira, Eturou; Yamaguchi, Shunzo; Kida, Masashi; and Ishida, Yasuhiko, to Nippon Soken, Inc.; and Toyota Jidosha Kogyo Kabushiki Kaisha. Engine exhaust gas purification system. 4,147,030, Cl. 60-276.000.
Katayama, Naohiro: *See*—
Okuda, Yukio; and Katayama, Naohiro, 4,147,970, Cl. 320-21.000.
Katayama, Tetsuji: *See*—
Yokota, Masato; and Katayama, Tetsuji, 4,147,150, Cl. 123-191.00S.
Kato, Akihiko: *See*—
Osumi, Yasuaki; Suzuki, Hiroshi; Kato, Akihiko; Nakane, Masanori; and Miyake, Yoshizo, 4,147,536, Cl. 75-134.00F.
Kato, Hajime; Igarashi, Akira; Matsukawa, Hiroharu; and Miyamoto, Akio, to Fuji Photo Film Co., Ltd. Recording sheet. 4,147,830, Cl. 428-324.000.
Kato, Mituyosi, to Toyokon Kaihatsu Co., Ltd. Protection conduit line for laying underground cables. 4,147,449, Cl. 405-154.000.
Kato, Yoshiharu, to Ltd. Tesika. Stacked filtering plates. 4,147,633, Cl. 210-232.000.
Kato, Yoshito: *See*—
Fukuma, Nobuo; Kato, Yoshito; and Nogami, Kouji, 4,147,965, Cl. 318-256.000.
Kautz, Glenn E., to H. H. Robertson Company. Light valve system and greenhouse utilizing the same. 4,147,002, Cl. 52-306.000.
Kawahara, Toru: *See*—
Endo, Tomizo; Sumida, Yutaka; Kawahara, Toru; Ohtake, Masaichi; Motokawa, Shoichi; Nagayama, Keiji; Shigeta, Masatomo; Hozuma, Hiroshi; Tomizawa, Masaharu; and Kikuchi, Hideo, 4,147,753, Cl. 422-202.000.
Kawai, Hisasi; and Ina, Toshikazu, to Nippon Soken, Inc. Apparatus for controlling an electromagnetic valve. 4,148,090, Cl. 361-152.000.
Kawakami, Sigezo; Tsuji, Kunihiko; Omura, Hiroshi; and Ishizuka, Hisai, to Kobe Steel, Ltd. Apparatus for scraping away substances adhering to inner wall of rotary kiln. 4,147,505, Cl. 432-118.000.
Kawakubo, Kazuo: *See*—
Goshima, Yoshitomo; Onoda, Shigeyoshi; Kawakubo, Kazuo; Hoshino, Osamu; Tsunoi, Haruo; and Iida, Noriyoshi, 4,147,501, Cl. 432-60.000.
Kawamura, Atsushi; and Kawazu, Motoaki, to Ricoh Company, Ltd. Fixture for mounting bar lens array in electrophotographic apparatus. 4,147,412, Cl. 350-252.000.
Kawazu, Motoaki: *See*—
Kawamura, Atsushi; and Kawazu, Motoaki, 4,147,412, Cl. 350-252.000.
Kayano, Hideo: *See*—
Yajima, Seishi; Kayano, Hideo; Asada, Chiaki; and Saito, Makoto, 4,147,538, Cl. 75-229.000.
Kearney, Thomas E.: *See*—
Brook, Richard L.; Gaske, Joseph E.; Kearney, Thomas E.; and Wydeen, Russell D., 4,147,253, Cl. 206-205.000.
Kekish, George T., to Nalco Chemical Company. Preparation of cupola flux. 4,147,539, Cl. 75-257.000.
Kelbaugh, Paul R.; and Sarges, Reinhard, to Pfizer Inc. Spirofuranohydantoin derivatives. 4,147,797, Cl. 424-273.00R.
Kelley, Richard N.: *See*—
Campbell, Gerald A.; and Kelley, Richard N., 4,147,550, Cl. 96-87.00A.
Kellor, Richard L., to Cargill, Incorporated. Treatment of vegetable protein. 4,147,810, Cl. 426-629.000.
Kelly, John, personal representative: *See*—
Kelly, William, deceased; Kelly, John, personal representative; and Halpein, Alfred, 4,147,776, Cl. 424-175.000.
Kelly, John D.; Hammond, Wayne S.; and Taylor, Gordon A., to United States of America, Navy. Method and means for defocusing engine cavity reflected energy. 4,148,032, Cl. 343-18.00A.
Kelly, Monica, personal representative: *See*—
Kelly, William, deceased; Kelly, John, personal representative; and Halpein, Alfred, 4,147,776, Cl. 424-175.000.
Kelly, William, deceased (by Kelly, Monica, personal representative); Kelly, John, personal representative; and Halpein, Alfred, to Mundipharma, AG. Stabilized choline salicylate compounds. 4,147,776, Cl. 424-175.000.
Kelm, Edward C., to Geophysical Systems Corp. Seismic cable for use with array terminal type acquisition systems. 4,148,006, Cl. 340-15.5TS.
Kemanobel AB: *See*—
Petersen, Jorgen, 4,147,845, Cl. 521-56.000.
Kendall Company, The: *See*—
Taylor, Glenn N., 4,147,169, Cl. 128-349.00B.
Taylor, Glenn N., 4,147,170, Cl. 128-349.0BV.
Kendall, Giles A.; and Minick, Robert, to Menasco Manufacturing Company. Aircraft landing gear assembly. 4,147,316, Cl. 244-102.00R.
Kende, Andrew S.; Mills, John E.; and Tsay, Yuh-Geng, to Research Corporation. Intermediates for polycyclic quinonoid antibiotics. 4,147,706, Cl. 260-365.000.
Kenney Manufacturing Company: *See*—
Cameron, John K., 4,147,199, Cl. 160-330.000.
Kerff, Anton: *See*—
Carlsson, Erik; Pejchal, Karel; Fritzon, Hans G.; Hagstrom, Staffan; Kerff, Anton; and Wide, Lars, 4,147,187, Cl. 139-196.200.
Kerns, Becky T.; Logan, Walter; McKnight, Lee G.; Ostermayer, Frederick W., Jr.; and Terry, Milton E., to Bell Telephone Laboratories, Incorporated. Voltage surge protector. 4,148,089, Cl. 361-119.000.
Kerr, Edwin R.: *See*—
Dorawala, Tansukhlal G.; Kerr, Edwin R.; Kochis, Robert G.; and Koniz, Leon F., 4,147,734, Cl. 260-672.00R.
Love, Richard F.; Kerr, Edwin R.; and Knifton, John F., 4,147,730, Cl. 260-604.0HF.
Kershaw, Bernard J., to Du Pont of Canada Limited. Process for purifying adiponitrile. 4,147,717, Cl. 260-465.80R.
Kershner, Stuart D.: *See*—
Swiderski, Walter L., Jr.; O'Brien, John J.; and Kershner, Stuart D., 4,147,220, Cl. 173-170.000.

Khardin, Alexandr P.: *See—*
Gokhberg, Pavel Y.; Gorbunov, Boris N.; Khardin, Alexandr P.; Rudkovsky, Vladimir L.; Belyaev, Valentin M.; Lukashov, Anatoly I.; Shpantseva, Ljudmila V.; and Orlyansky, Vitaly V., 4,147,736, Cl. 260-681.000.

Kicinski, Kenneth J.: *See—*
Ormond, Theodore W.; and Kicinski, Kenneth J., 4,147,230, Cl. 181-231.000.

Kida, Masashi: *See—*
Katahira, Eturou; Yamaguchi, Shunzo; Kida, Masashi; and Ishida, Yasuhiko, 4,147,030, Cl. 60-276.000.

Kidde Consumer Durables Corp.: *See—*
Belinkoff, Irving R., 4,147,925, Cl. 219-530.000.

Kikuchi, Hideo: *See—*
Endo, Tomizo; Sumida, Yutaka; Kawahara, Toru; Ohtake, Masaichi; Motokawa, Shoichi; Nagayama, Keiji; Shigeta, Masatomo; Hozuma, Hiroshi; Tomizawa, Masaharu; and Kikuchi, Hideo, 4,147,753, Cl. 422-202.000.

Kilgus, Donald C., deceased; and by Kilgus, Marjorie M., executrix. Tie-down winch. 4,147,113, Cl. 105-477.000.

Kilgus, Marjorie M., executrix: *See—*
Kilgus, Donald C., deceased; and Kilgus, Marjorie M., executrix, 4,147,113, Cl. 105-477.000.

Kimball International, Inc.: *See—*
Robinson, John W.; and Howell, Stephen L., 4,147,085, Cl. 84-1.170.

Kimura, Kunio: *See—*
Nishino, Atsushi; Sonetaka, Kazunori; Kimura, Kunio; and Ikeda, Nasaki, 4,147,835, Cl. 428-450.000.

Kincel, Roger S., to BASF Aktiengesellschaft. Tape transport apparatus. 4,147,315, Cl. 242-192.000.

King, Bobby J. Game equipment having stepped ramp means. 4,147,359, Cl. 273-241.000.

King, John O., Jr. Method of installing a reverse taper fastener in workpieces. 4,146,953, Cl. 29-453.000.

King, Robin C. M., to English Electric Valve Company Limited. Travelling wave tubes. 4,147,955, Cl. 315-3.500.

Kippenberg, Horst: *See—*
Hassler, Heinrich; and Kippenberg, Horst, 4,147,909, Cl. 200-265.000.

Kirby, William E.; and Seymour, David J., to Wharton Shipping Corporation. Barge-carrying waterborne vessel for flotation loading and unloading, and transportation method. 4,147,123, Cl. 114-260.000.

Kiss, Howard M. Worm harvesting apparatus and method. 4,147,256, Cl. 209-632.000.

Kitada, Masaya: *See—*
Akae, Kiyoshi; Kitada, Masaya; and Uno, Yoshiyuki, 4,147,504, Cl. 432-101.000.

Kitasato Institute, The: *See—*
Umezawa, Iwao; Komiyama, Kanki; and Takeshima, Hideo, 4,147,774, Cl. 424-118.000.

Kiuchi, Mitsuyuki; Mizukawa, Takumi; Amagami, Keizo; and Yoshida, Hirokazu, to Matsushita Electric Industrial Co., Ltd. Power adjustment with variable frequency and duty-cycle control for induction heating apparatus. 4,147,910, Cl. 219-10.49R.

Kivimaa, Eero M. Cutter head. 4,147.193, Cl. 144-235.000.

Klaffke, Friedemann: *See—*
Heckel, Klaus; Klaffke, Friedemann; and Umann, Walter, 4,147,828, Cl. 428-255.000.

Klanica, Andrew J.: *See—*
Wojtowicz, John A.; and Klanica, Andrew J., 4,147,761, Cl. 423-473.000.

Klass, Donald L., to Institute of Gas Technology. Storage of fuel gas. 4,147,456, Cl. 405-210.000.

Kleespies, Richard M.; and Parke, Fred F. Lock-in lock-out rear hub power assembly. 4,147,226, Cl. 180-70.00R.

Klein, Robert W.; and Foxx, Mary E., to William H. Rorer, Inc. Pharmaceutical detergent composition. 4,147,782, Cl. 424-230.000.

Klein, Schanzlin & Becker Aktiengesellschaft: *See—*
Schiele, Otto; and Florjancic, Dusan, 4,147,465, Cl. 415-143.000.

Klein, Willi; and Rocholl, Henning, to Bergische Stahl-Industrie. Brake disc connection. 4,147,240, Cl. 188-218.0XL.

Klimek, Boleslaw M.; and Mastis, Victor, to Echlin Manufacturing Company, The. Vehicle brake system. 4,147,394, Cl. 303-118.000.

Klimenkov, Dmitry A.: *See—*
Pronko, Vladimir G.; Onosovsky, Evgeny V.; Chuvpilo, Albert V.; Zhuravleva, Irina N.; Korneev, Viktor A.; Klimenkov, Dmitry A.; Smirnova, Galina M.; Usanov, Vladimir V.; Ivanov, Jury I.; Chernyshev, Boris A.; Nikitkin, Vasily D.; Nikolaev, Anatoly F.; Trizno, Maya S.; Karkozov, Valery G.; Verkhoglyadova, Tatyana J.; Moskalev, Evgeny V.; and Yakovleva, Lidia I., 4,147,210, Cl. 165-165.000.

Kline, Richard H., to Goodyear Tire & Rubber Company, The. Age resisters and age resistant polymeric compositions. 4,147,880, Cl. 560-142.000.

Kling, Alberto. Turbine rotor. 4,147,472, Cl. 416-193.00R.

Klockner-Humboldt-Deutz AG: *See—*
Herchenbach, Horst; and Schneider, Richard, 4,147,503, Cl. 432-78.000.

Kluger, Michael A., to Bendix Corporation, The. Drum brake assembly having integral cable support. 4,147,239, Cl. 188-79.5GC.

Knape & Vogt Manufacturing Co.: *See—*
Nelson, Larry J.; and Fortuna, John E., II, 4,147,393, Cl. 308-3.600.

Knifton, John F.: *See—*
Love, Richard F.; Kerr, Edwin R.; and Knifton, John F., 4,147,730, Cl. 260-604.0HF.

Knight, John R. Solar energy collector. 4,147,561, Cl. 136-206.000.

Knofel, Hartmut; and Ellendt, Gunther, to Bayer Aktiengesellschaft. Process for the preparation of polyamines. 4,147,724, Cl. 260-570.00D.

Knudsen, Kenneth F., to American Chain & Cable Company, Inc. Power and free conveyor system. 4,147,110, Cl. 104-172.00S.

Kobayashi, Akio; Shimohiro, Yoshiyuki; Shimizu, Kisaburou; and Murakami, Yoshiaki, to Dainippon Pharmaceutical Co., Ltd. Fixing agent for improving fastness properties of dyeings on polyamide fibers and preparation thereof. 4,147,512, Cl. 8-165.000.

Kobayashi, Norio; and Fukamachi, Yoshihiro, to Bridgestone Tire Company Limited. Pneumatic tire building method and apparatus. 4,147,577, Cl. 156-123.00R.

Kobe Steel, Ltd.: *See—*
Kawakami, Sigezo; Tsuji, Kunihiko; Omura, Hiroshi; and Ishizuka, Hisai, 4,147,505, Cl. 432-118.000.

Kochis, Robert G.: *See—*
Dorawala, Tansukhlal G.; Kerr, Edwin R.; Kochis, Robert G.; and Koniz, Leon F., 4,147,734, Cl. 260-672.00R.

Koenig & Bauer Aktiengesellschaft: *See—*
Bolza-Schunemann, Hans B., 4,147,337, Cl. 270-19.000.

Koepp, Ronald L., to Fairchild Camera and Instrument Corporation. Alarm sounder for A.C. operated solid state devices. 4,148,018, Cl. 340-401.000.

Koff, Fred W.; Tunick, Allen A.; and Sifniades, Stylianos, to Allied Chemical Corporation. Hydroxylamine purification via ion exclusion. 4,147,623, Cl. 210-31.00R.

Kohama, Tokio; Obayashi, Hideki; Ozaki, Tadashi; and Nohira, Hidetaka, to Nippon Soken, Inc.; and Toyota Jidosha Kogyo Kabushiki Kaisha. Device for supplying secondary air for purifying exhaust gases discharged from internal combustion engine. 4,146,986, Cl. 60-290.000.

Koike, Norio; Takemoto, Iwao; and Kubo, Masaharu, to Hitachi, Ltd. Solid-state imaging device. 4,148,051, Cl. 357-30.000.

Koike, Norio: *See—*
Takemoto, Iwao; Koike, Norio; and Kubo, Masaharu, 4,148,048, Cl. 357-30.000.

Koitabashi, Takeo; Fujimori, Noboru; and Itoh, Shigemasa, to Konishiroku Photo Industry Co., Ltd. Silver halide color photographic material. 4,147,547, Cl. 96-74.000.

Kolbanev, Alexei V.: *See—*
Bystrov, Nikolai M.; Simonov, Anatoly N.; Levin, Alexandr B.; Meshkov, Jury K.; Zakharov, Anatoly A.; and Kolbanev, Alexei V., 4,147,527, Cl. 65-183.000.

Kolowski, Michael A.: *See—*
Duderstadt, John F.; Gresens, Henry L.; and Kolowski, Michael A., 4,147,751, Cl. 264-326.000.

Kolyshkin, Boris S.: *See—*
Suslin, Vladimir I.; Dubovik, Alexandr I.; Makeev, Boris A.; Pilipenko, Vitaly A.; Lekarev, Zinovy A.; and Kolyshkin, Boris S., 4,147,609, Cl. 204-224.00M.

Komiyama, Kanki: *See—*
Umezawa, Iwao; Komiyama, Kanki; and Takeshima, Hideo, 4,147,774, Cl. 424-118.000.

Komiyama, Yoshiro: *See—*
Noguchi, Masamitsu; Komiyama, Yoshiro; and Hashimoto, Masaoki, 4,147,074, Cl. 74-559.000.

Kommandiittihytio Finnpipette Osmo A. Souvaniemi: *See—*
Suovaniemi, Osmo A.; Ekholm, Pertti; Suni, Jukka; and Jarnefelt, Johan, 4,147,752, Cl. 422-57.000.

Kondo, Hisanori: *See—*
Sagawa, Seiji; Numata, Kenichiro; and Kondo, Hisanori, 4,147,696, Cl. 546-198.000.

Kondo, Kenichi, to Kabushiki Kaisha Daini Seikosha. Electronic watch having an alarm means. 4,147,021, Cl. 58-16.00D.

Kondo, Shinichi: *See—*
Umezawa, Hamao; Maeda, Kenji; Kondo, Shinichi; and Umezawa, Sumio, 4,147,861, Cl. 536-10.000.

Kongpricha, Santad: *See—*
Richards, Thomas E.; and Kongpricha, Santad, 4,147,757, Cl. 423-313.000.

Konieczynski, Ronald D.: *See—*
Wright, Richard B.; and Konieczynski, Ronald D., 4,147,076, Cl. 81-63.200.

Konig, Hans-Bodo; Metzger, Karl G.; Preiss, Michael; and Schrock, Wilfried, to Bayer Aktiengesellschaft. Lactam antibiotics and process for their use. 4,147,693, Cl. 424-246.000.

Konig, Klaus: *See—*
Hetzel, Hartmut; Konig, Klaus; Schmelzer, Hans G.; and Wagner, Kuno, 4,147,714, Cl. 260-453.0AB.

Konishiroku Photo Industry Co., Ltd.: *See—*
Habu, Teiji; Nakajima, Tomio; Sakamoto, Eiichi; Fujimori, Noboru; and Mine, Kiyomitsu, 4,147,542, Cl. 96-27.00E.
Koitabashi, Takeo; Fujimori, Noboru; and Itoh, Shigemasa, 4,147,547, Cl. 96-74.000.

Koniz, Leon F.: *See—*
Dorawala, Tansukhlal G.; Kerr, Edwin R.; Kochis, Robert G.; and Koniz, Leon F., 4,147,734, Cl. 260-672.00R.

Kopecky, Eugene F. Plaster spraying and concrete mixing machine. 4,147,331, Cl. 366-46.000.

Kopl, Manfred: *See—*
Korner, Jorg-Peter; Stalzer, Josef; Dornhoff, Gunther; and Kopl, Manfred, 4,147,517, Cl. 422-242.000.

Koppers Company, Inc.: *See—*
Cain, George R.; Gidick, Ward F.; and Edgar, William D., 4,147,594, Cl. 201-39.000.

Koppers, Manfred; and Oppenlander, Harry, to Thyssen Industrie AG. Shifting device connected with a longwall conveyor for a progressive timbering frame. 4,147,459, Cl. 405-303.000.

Korneev, Viktor A.: *See—*
Pronko, Vladimir G.; Onosovsky, Evgeny V.; Chuvpilo, Albert V.; Zhuravleva, Irina N.; Korneev, Viktor A.; Klimenkov, Dmitry A.; Smirnova, Galina M.; Usanov, Vladimir V.; Ivanov, Jury I.; Chernyshev, Boris A.; Nikitkin, Vasily D.; Nikolaev, Anatoly F.; Trizno, Maya S.; Karkozov, Valery G.; Verkhoglyadova, Tatyana J.; Moskalev, Evgeny V.; and Yakovleva, Lidia I., 4,147,210, Cl. 165-165.000.

Korner, Jorg-Peter; Stalzer, Josef; Dornhoff, Gunther; and Kopl, Manfred, to Uhde, GmbH. Three-way-valve. 4,147,517, Cl. 422-242.000.

Korsunsky, Vyacheslav S.: *See—*
Golovchinskaya, Elena S.; Chernov, Vladimir A.; Chaman, Elena S.; Nikolaeva, Ljudmila A.; and Korsunsky, Vyacheslav S., 4,147,867, Cl. 544-244.000.

Koss, Muriel L., to Rohr Industries, Incorporated. Method of making acoustical laminate. 4,147,578, Cl. 156-245.000.

Kostka, Antonin: *See—*
Balcar, Cestmir; Kostka, Antonin; Havranek, Jaroslav; and Lalak, Marcel, 4,147,616, Cl. 209-12.000.

Kotaro, Ishii; Masahiko, Mitsutsuka; and Tomoyuki, Osada, to Pacific Metals Co., Ltd. Method for recovering heat from molten slag and an apparatus therefor. 4,147,332, Cl. 266-44.000.

Kotitschke, Ronald: *See—*
Stephan, Wolfgang; and Kotitschke, Ronald, 4,147,765, Cl. 424-12.000.

Kovach, Alan J.: *See—*
Gorgone, Robert L.; Iannadrea, Gerald; and Kovach, Alan J., 4,147,430, Cl. 356-51.000.

Kovanda, Robert J.; Maliar, Serge, Jr.; and Spencer, Robert W., to PQ Corporation. Mixing reactive liquids and preparing coagulant aids. 4,147,657, Cl. 252-313.00S.

Kozischek, James F., to Armour Pharmaceutical Company. Macrospherical particles of anti-perspirants. 4,147,766, Cl. 424-14.000.

Kozlow, Michael R.: *See—*
Harting, Louis L.; and Kozlow, Michael R., 4,147,186, Cl. 138-155.000.

Krafft, Frederick G. Device for collecting solar energy. 4,147,155, Cl. 126-271.000.

Kramer, Wolfgang: *See—*
Meiser, Werner; Buchel, Karl H.; Kramer, Wolfgang; and Grewe, Ferdinand, 4,147,791, Cl. 424-269.000.

Krasser, Fritz, to Ellenberger & Poensgen GmbH. Electric switches. 4,148,002, Cl. 337-74.000.

Kratel, Gunter; Stohr, Gunter; Eberle, Ludwig; and Muhlhofer, Ernst, to Wacker-Chemie GmbH. Thickening agent for liquid media consisting of highly dispersed silicon dioxide and process for making the same. 4,147,760, Cl. 423-336.000.

Kronseder, Hermann; and Dullinger, Karl, to Kronseder, Hermann. Bottle treating apparatus. 4,147,011, Cl. 53-137.000.

Kroposki, Lorraine M.: *See—*
Freedman, Harold H.; McGregor, Stanley D.; Yoshimine, Masao; and Kroposki, Lorraine M., 4,147,866, Cl. 544-243.000.

Krude, Werner: *See—*
Girguis, Sobhy; Krude, Werner; and Harz, Peter, 4,147,041, Cl. 64-17.00A.

Kruschwitz, Werner, to Draftex Development AG. Windows. 4,147,006, Cl. 52-401.000.

Kryazhev, Jury T.: *See—*
Gorodissky, Leonid G.; Evtikhovich, Stanislav M.; Grigoriev, Igor P.; Kvashnin, Nikolai A.; Sokolov, Vladislav I.; Chekreneva, Larisa S.; Birdus, Rostislav G.; Zaitseva, Maria A.; Kryazhev, Jury T.; Kuzminova, Galina V.; and Romanov, Nikolai T., deceased, 4,147,366, Cl. 277-22.000.

Krytar: *See—*
Russell, Thomas J., 4,147,998, Cl. 333-238.000.

Kubo, Masaharu: *See—*
Koike, Norio; Takemoto, Iwao; and Kubo, Masaharu, 4,148,051, Cl. 357-30.000.
Takemoto, Iwao; Koike, Norio; and Kubo, Masaharu, 4,148,048, Cl. 357-30.000.

Kubo, Norimasa: *See—*
Ogasawara, Toshiya; Kubo, Norimasa; Nagino, Hiroshi; Takeda, Mamoru; and Ochiishi, Masanori, 4,147,452, Cl. 405-134.000.

Kubota, Yukio: *See—*
Okada, Hidehiko; Morio, Minoru; Kambara, Masahiro; and Kubota, Yukio, 4,148,082, Cl. 360-77.000.

Kubotera, Kikuo; Mizuki, Eiichi; Satomura, Masato; Iwano, Haruhiko; and Fujiwara, Tadahiro, to Fuji Photo Film Co., Ltd. Developer compositions for high contrast diffusion transfer photographic materials and process therefor. 4,147,543, Cl. 96-29.00R.

Kuesters, Werner; Heil, Guenter; Fischer, Martin; Eisert, Manfred; and Kast, Hellmut, to BASF Aktiengesellschaft. Photopolymerizable binders containing diaminobenzophenones. 4,147,604, Cl. 204-159.230.

Kuhla, Donald E.: *See—*
Brennan, Thomas M.; Brannegan, Daniel P.; Weeks, Paul D.; and Kuhla, Donald E., 4,147,705, Cl. 260-345.90R.

Kuhn, Edmund W.; and Bennett, Allan I., to Westinghouse Electric Corp. Capacitively coupled indicator for a submersible fuse. 4,148,024, Cl. 340-638.000.

Kumagai, Yoriaki: *See—*
Ikebe, Jun; Kumagai, Yoriaki; Takakura, Kintomo; and Ohta, Michio, 4,147,161, Cl. 128-2.00R.

Kume, Hirofumi: *See—*
Yamawaki, Takeshi; and Kume, Hirofumi, 4,147,336, Cl. 267-111.000.

Kunkel, Wolfgang: *See—*
Vogt, Alfred; and Kunkel, Wolfgang, 4,147,134, Cl. 122-5.000.

Kunz, Raymond W.: *See—*
Walter, Henry J.; and Kunz, Raymond W., 4,147,921, Cl. 219-211.000.

Kunz, Walter; Eckhardt, Wolfgang; and Hubele, Adolf, to Ciba-Geigy Corporation. Fungicidal compositions. 4,147,792, Cl. 424-269.000.

KUPAG Kunststoff-Patent-Verwaltungs AG: *See—*
Ringdal, Lars, 4,147,107, Cl. 102-43.00P.

Kupferberg, Alfred B., deceased: *See—*
Asculai, Samuel S.; Kupferberg, Alfred B., deceased; and Halpern, coexecutor, by Meyer, 4,147,803, Cl. 424-320.000.

Kupferberg, Beatrice, coexecutor: *See—*
Asculai, Samuel S.; Kupferberg, Alfred B., deceased; and Halpern, coexecutor, by Meyer, 4,147,803, Cl. 424-320.000.

Kurata, Junichi; Ishikawa, Kazushige; and Nagashima, Nozomu, to Pioneer Electronic Corporation. Record player. 4,147,365, Cl. 274-9.0RA.

Kurczak, Walter; and Anthony, Richard, to Mojonnier Bros. Co. Dividing container conveyor. 4,147,248, Cl. 198-358.000.

Kurechi, Taichi: *See—*
Akao, Mutsuo; and Kurechi, Taichi, 4,147,291, Cl. 229-55.000.

Kureha Kagaku Kogyo Kabushiki Kaisha: *See—*
Endo, Tomizo; Sumida, Yutaka; Kawahara, Toru; Ohtake, Masaichi; Motokawa, Shoichi; Nagayama, Keiji; Shigeta, Masatomo; Hozuma, Hiroshi; Tomizawa, Masaharu; and Kikuchi, Hideo, 4,147,753, Cl. 422-202.000.

Kurilkin, Vitaly V.: *See—*
Artemiev, Lev N.; and Kurilkin, Vitaly V., 4,147,588, Cl. 176-30.000.

Kurr, Detlef: *See—*
Hohenberg, Gunter; and Kurr, Detlef, 4,147,054, Cl. 73-117.300.

Kuzminova, Galina V.: *See—*
Gorodissky, Leonid G.; Evtikhovich, Stanislav M.; Grigoriev, Igor P.; Kvashnin, Nikolai A.; Sokolov, Vladislav I.; Chekreneva, Larisa S.; Birdus, Rostislav G.; Zaitseva, Maria A.; Kryazhev, Jury T.; Kuzminova, Galina V.; and Romanov, Nikolai T., deceased, 4,147,366, Cl. 277-22.000.

Kvashnin, Nikolai A.: *See—*
Gorodissky, Leonid G.; Evtikhovich, Stanislav M.; Grigoriev, Igor P.; Kvashnin, Nikolai A.; Sokolov, Vladislav I.; Chekreneva, Larisa S.; Birdus, Rostislav G.; Zaitseva, Maria A.; Kryazhev, Jury T.; Kuzminova, Galina V.; and Romanov, Nikolai T., deceased, 4,147,366, Cl. 277-22.000.

Kyowa Hakko Kogyo Co., Ltd.: *See—*
Obase, Hiroyuki; and Kasuya, Yutaka, 4,147,799, Cl. 424-282.000.

Laboratoires Creat: *See—*
Poupelin, Jean-Pierre, 4,147,806, Cl. 424-343.000.

Laboratorios Liade, S.A.: *See—*
Garcia, Antonio A.; Ruiz, Juan R. C.; and Lozano, Juan B., 4,147,870, Cl. 544-383.000.

Lacis, Laimons; and Horvath, Steven, to Gordos Corporation. Reed switch construction. 4,148,000, Cl. 335-58.000.

LaCosta, Nicholas J.: *See—*
Gore, Bertram W.; LaCosta, Nicholas J.; and Barr, Irwin R., 4,147,108, Cl. 102-67.000.

Lafont, Robert; and Hallot, Louis H., to Regie Nationale des Usines Renault. Method and apparatus of producing iron. 4,147,334, Cl. 266-89.000.

Lalak, Marcel: *See—*
Balcar, Cestmir; Kostka, Antonin; Havranek, Jaroslav; and Lalak, Marcel, 4,147,616, Cl. 209-12.000.

Lampen, James L.: *See—*
Thoren, Glenn R.; Lampen, James L.; and Jerinic, George, 4,147,994, Cl. 331-56.000.

Land, Tom G. Saddle girth. 4,147,015, Cl. 54-23.000.

Landa, Mikhail L.; Sinelnikov, Vladimir Y.; Stasenko, Rostislav F.; and Shishkov, Igor M. Device for overload protection of electric apparatus. 4,148,086, Cl. 361-37.000.

Landholm, Richard A.: *See—*
Anderson, Richard B.; Hoffmeister, Elaine H.; and Landholm, Richard A., 4,147,544, Cl. 96-29.00D.

Lange, Klaus: *See—*
Reinke, Friedhelm; Emde, Friedhelm; Geisel, Herbert; Gies, Rolf; Muller-Axt, Friedrich; Lange, Klaus; and Schoenen, Manfred, 4,147,569, Cl. 148-128.000.

Langer, Arthur W., Jr.; and Bunting, William M., to Exxon Research & Engineering Co. Reductions of inorganic substrates with chelated sodium hydridoaluminates or hydridoborates. 4,147,530, Cl. 75-0.50A.

Langham, Maurice E., to Dobbie, Graham J., a part interest. Method for the treatment of onchocerciasis. 4,147,785, Cl. 424-250.000.

Lannert, Kent P.: *See—*
Crutchfield, Marvin M.; and Lannert, Kent P., 4,147,702, Cl. 260-340.600.

Lares, Albert J.: *See—*
Lares, Joseph P.; and Lares, Albert J., 4,146,964, Cl. 32-27.000.

Lares, Joseph P.; and Lares, Albert J. Dental handpiece. 4,146,964, Cl. 32-27.000.

Larsen, Lawrence E.; and Jacobi, John H., to United States of America, Army. Thermometric transducer device. 4,148,005, Cl. 338-28.000.
Larson, David W. Indicators and shutdown system for plating. 4,147,610, Cl. 204-228.000.
Larsson, Torsten O.: *See*—
Lewkowicz, Josef; and Larsson, Torsten O., 4,147,234, Cl. 184-6.260.
Laskin, Irving: *See*—
Whiteside, George D.; and Laskin, Irving, 4,147,418, Cl. 354-27.000.
La Spina, Andrea; Dietrich, Werner; and Schliebs, Reinhard, to Bayer Aktiengesellschaft. Compounds containing phosphorous and a method for making polycarbodiimide foams with the compounds as a catalyst. 4,147,710, Cl. 260-429.900.
Lather, Dieter; Janssen, Klaus-Uwe; Ries, Karl; Moller, Peter; and Forstermann, Ulrich, to Mannesmann AG.; and Karl Deutsch Pruf- und Messgeratebau. Ultrasonic testing. 4,147,065, Cl. 73-611.000.
Lauffer, Donald K.; and Ward, William P., to NCR Corporation. Memory device having a minimum number of pins. 4,148,099, Cl. 365-226.000.
Laus, Heinrich, to Girmes-Werke AG. Production of colored patterns on nap fabrics. 4,147,507, Cl. 8-1.0XB.
Laval, Claude C., Jr. Hydraulic separating device with automatic flow control. 4,147,630, Cl. 210-137.000.
Lavallee, Francois A., to General Electric Company. Lamp glass envelope containing marking thereon. 4,147,823, Cl. 428-35.000.
Lavallee, Pierre A.: *See*—
Crean, Peter A.; and Lavallee, Pierre A., 4,147,928, Cl. 235-454.000.
Leacock, James, to Halcon Research and Development Corporation. Process for recovering methacrylic acid. 4,147,721, Cl. 562-532.000.
Leas, Arnold M. Hot sand-coal-cracking to hydrodistillate fuels. 4,147,615, Cl. 208-9.000.
Ledbetter, Robert L.: *See*—
Hoebing, Richard F.; and Ledbetter, Robert L., 4,147,038, Cl. 62-180.000.
Lee, Arthur L. Tensioning type physical therapeutical treatment device. 4,147,344, Cl. 272-136.000.
Lee, D. William; O'Brien, John L.; and Rossetti, Michael, to Arthur D. Little, Inc. Lubricant for forming metals at elevated temperatures. 4,147,639, Cl. 252-25.000.
Lee, Gim F., Jr., to General Electric Company. Thermoplastic molding compositions of rubber modified copolymers of a vinyl aromatic compound and an $\alpha,\beta$-unsaturated cyclic anhydride. 4,147,739, Cl. 260-876.00R.
Lee, J. Kelly. Tennis racket providing increased hitting power. 4,147,348, Cl. 273-73.00C.
Lee, Kyu T., to Du Pont de Nemours, E. I., and Company. Antibacterials: 1-difluoromethyl-6,7-methylenedioxy-1,4-dihydro-4-oxo-3-quinolinecarboxylic acid and its esters. 4,147,788, Cl. 424-258.000.
Lee, Minja P.: *See*—
Lee, Sang C.; and Lee, Minja P., 4,147,363, Cl. 273-304.000.
Lee, Sang C.; and Lee, Minja P. Multi-game deck of tiles. 4,147,363, Cl. 273-304.000.
Leemhuis, Louis J., to Leemhuis, Louis J. Fluid flow controller. 4,147,298, Cl. 236-49.000.
Leffingwell, Edward A., to General Electric Company. Rechargeable battery with separate charging terminal. 4,147,838, Cl. 429-1.000.
Lefort, Marcel: *See*—
Bargain, Michel; and Lefort, Marcel, 4,147,711, Cl. 260-448.20N.
Leiby, Clare C., Jr., to United States of America, Air Force. Foil moderated radioactive preionization system for gas lasers. 4,147,995, Cl. 331-94.5PE.
Leicht, Werner; and Ruetz, Georg, to Motoren- und Turbinen-Union Friedrichshafen GmbH. Exhaust gas turbocharger. 4,147,467, Cl. 415-196.000.
Lejeune, Marc: *See*—
Deliege, Jacques; Giot, Michel; Obolensky, Vsevolod; Deconinck, Luc; and Lejeune, Marc, 4,147,390, Cl. 299-8.000.
LEK tovarna farmacevtskih ibn kemicnih izdelkov, n.sol.o: *See*—
Zupancic, Boris; and Jenko, Branko, 4,147,729, Cl. 260-591.000.
Lekarev, Zinovy A.: *See*—
Suslin, Vladimir I.; Dubovik, Alexandr I.; Makeev, Boris A.; Pilipenko, Vitaly A.; Lekarev, Zinovy A.; and Kolyshkin, Boris S., 4,147,609, Cl. 204-224.00M.
Lemelson, Jerome H. Scanning apparatus and method. 4,148,061, Cl. 358-101.000.
Lenhard, Robert H.; and Bernstein, Seymour, to American Cyanamid Company. Complement inhibitors. 4,147,801, Cl. 424-315.000.
Leonard, Clarence E. Cross blend or solvent type rust converting paint. 4,147,566, Cl. 148-6.15R.
Leppert, Alfred M. Incinerator with gas generation. 4,147,115, Cl. 110-244.000.
Lermann, Peter: *See*—
Fauth, Gunter; and Lermann, Peter, 4,147,421, Cl. 354-192.000.
Lesieux, Jean-Robert: *See*—
Holz, Robert G.; Lesieux, Jean-Robert; and Pigot, Maurice R., 4,147,945, Cl. 310-115.000.
Lester, Joseph E.: *See*—
McKinzie, Howard; Lester, Joseph E.; and Palilla, Frank C., 4,147,763, Cl. 423-570.000.
Lesyk, Leo, to Bird Electronic Corporation. Convective-type radiator with internal heat transfer medium. 4,147,207, Cl. 165-106.000.
Levin, Alexandr B.: *See*—
Bystrov, Nikolai M.; Simonov, Anatoly N.; Levin, Alexandr B.; Meshkov, Jury K.; Zakharov, Anatoly A.; and Kolbanev, Alexei V., 4,147,527, Cl. 65-183.000.
Levine, Jack W.; and Bonheim, Hans, to New Hermes, Incorporated. Engraving machine for rings and bangle bracelets. 4,146,966, Cl. 33-24.00B.
Levine, Walter E., to Bindicator Company. Rotation paddle bin level indicator. 4,147,906, Cl. 200-61.200.
Levy, Didya D.; and Ronel, Samuel H., to National Patent Development Corporation. Hydrophilic absorbents. 4,147,764, Cl. 424-1.000.
Levy, Sidney. Vacuum actuated pressurized fluid dispenser. 4,147,282, Cl. 222-387.000.
Lewandowski, Robert E. Insulated log building structure. 4,147,000, Cl. 52-233.000.
Lewandowski, Robert E. Solar heat tracking and collecting apparatus. 4,147,154, Cl. 126-270.000.
Lewis, John H., to Xonics, Inc. Low light level and infrared viewing system. 4,147,932, Cl. 250-330.000.
Lewis, Samuel J.: *See*—
Hyde, Phillip R.; and Lewis, Samuel J., 4,147,343, Cl. 272-33.00B.
Lewkowicz, Josef; and Larsson, Torsten O., to Atlas Copco AB. Method and system of lubricating a plurality of compressed air operated devices. 4,147,234, Cl. 184-6.260.
Licentia Patent-Verwaltungs-G.m.b.H.: *See*—
Burkhardt, Gisbert, 4,147,252, Cl. 198-732.000.
Gochermann, Hans, 4,147,560, Cl. 136-89.00H.
Licitis, Gunars: *See*—
Barlow, Gordon A.; Licitis, Gunars; and Wildman, John R., 4,147,355, Cl. 273-101.100.
Liebman, Arnold A.; and Liu, Yu-Ying, to Hoffmann-La Roche Inc. Process to produce 8-methoxypsoralen. 4,147,703, Cl. 260-343.210.
Liepa, Alexander L.; and Japikse, Cornelis H., to Procter & Gamble Company, The. Beverage carbonation device and process. 4,147,808, Cl. 426-477.000.
Lilja, Launo L.; and Makitalo, Valto J., to Outokumpu Oy. Procedure for producing a suspension of a powdery substance and a reaction gas. 4,147,535, Cl. 75-74.000.
Lill, John F., to AMP Incorporated. Selective electrical connections among wires of different diameters. 4,147,398, Cl. 339-98.000.
Lim, Sim Koei; Bloomquist, Arnold E.; and Schaper, Raymond J., to Calgon Corporation. Stable, self-inverting water-in-oil emulsions. 4,147,681, Cl. 260-29.6TA.
Ltd. Tesika: *See*—
Kato, Yoshiharu, 4,147,633, Cl. 210-232.000.
Lindblad, Nero R.; Johnson, Gordon E.; and Sharp, James H., to Xerox Corporation. Electrostatic imaging member with acid lubricant. 4,147,541, Cl. 96-1.500.
Lindley, John P.: *See*—
Foster, L. Curtis; and Lindley, John P., 4,147,424, Cl. 356-352.000.
Lindquist, Carl G. Structural assembly for display of pictorial matter. 4,146,984, Cl. 40-152.000.
Lindsey, Ben, Jr. Front wheel drive for a bicycle. 4,147,370, Cl. 280-234.000.
Linscott, Phillip S., Jr.; and Schmohe, James S., to Sundstrand Corporation. Rotor structure for an electric machine. 4,147,946, Cl. 310-214.000.
Lippert, Irving S.: *See*—
Friedman, Harvey S.; Lippert, Irving S.; and Lothrop, John W., 4,147,425, Cl. 354-304.000.
Lipscomb, Walter P.; McKlveen, John R.; and Turner, Garland L., to Allied Chemical Corporation. Varied orientation of fibers. 4,147,749, Cl. 264-167.000.
Lisitskaya, Alla P.: *See*—
Pomogailo, Anatoly D.; Lisitskaya, Alla P.; Oskin, Viktor S.; Dyachkovsky, Fridrikh S.; Ponomarev, Ardalion N.; and Gorkova, Nina S., 4,147,664, Cl. 252-429.00B.
Little, Allan V., deceased; by Little, Anna, administratrix; and Wilkinson, Ronald A. Fuel modification system for internal combustion engines. 4,147,142, Cl. 123-133.000.
Little, Anna, administratrix: *See*—
Little, Allan V., deceased; Little, Anna, administratrix; and Wilkinson, Ronald A., 4,147,142, Cl. 123-133.000.
Liu, Joseph; Grimmett, Howard L.; and Hwang, Yu-Tang, to Chemplex Company. Method of making polymers and copolymers of 1-olefins. 4,147,849, Cl. 526-96.000.
Liu, Yu-Ying: *See*—
Liebman, Arnold A.; and Liu, Yu-Ying, 4,147,703, Cl. 260-343.210.
Lockley, Robert: *See*—
Kain, Per; Lockley, Robert; and Valis, Jaroslav, 4,147,966, Cl. 318-327.000.
Logan, Walter: *See*—
Kerns, Becky T.; Logan, Walter; McKnight, Lee G.; Ostermayer, Frederick W., Jr.; and Terry, Milton E., 4,148,089, Cl. 361-119.000.
Lohstroh, Jan: *See*—
Hart, Cornelis M.; and Lohstroh, Jan, 4,148,054, Cl. 357-44.000.
Lonberger, John W., to Owens-Corning Fiberglas Corporation. Glass fiber producing and collecting apparatus. 4,147,526, Cl. 65-11.00W.
Lori Engineering Corporation: *See*—
Testa, Frank J., 4,147,045, Cl. 70-314.000.
Lothrop, John W.: *See*—
Friedman, Harvey S.; Lippert, Irving S.; and Lothrop, John W., 4,147,425, Cl. 354-304.000.

Lotzmann, Manfred: *See—*
Domland, Christoph; and Lotzmann, Manfred, 4,147,145, Cl. 123-148.00E.
Love, Richard F.; Kerr, Edwin R.; and Knifton, John F., to Texaco Inc. Selective hydroformylation process. 4,147,730, Cl. 260-604.0HF.
Lover, Myron J.: *See—*
Singer, Arnold J.; Lover, Myron J.; Rhodes, William E., III; Bilodeau, William N.; and Lynch, Donald M., 4,147,800, Cl. 424-312.000.
Lowe, Laban R., Sr.: *See—*
Schnepfe, Robert W., Jr.; and Lowe, Laban R., Sr., 4,147,216, Cl. 169-70.000.
Lozano, Juan B.: *See—*
Garcia, Antonio A.; Ruiz, Juan R. C.; and Lozano, Juan B., 4,147,870, Cl. 544-383.000.
Lu, Chin H., to Xerox Corporation. Electrographic flash fusing toners. 4,147,645, Cl. 252-62.10P.
Lubrizol Corporation, The: *See—*
Pindar, John F.; and Cohen, Jerome M., 4,147,643, Cl. 252-52.00R.
Luby, John J.: *See—*
Bailey, Morris W.; Luby, John J.; and Carlton, Donald G., 4,147,197, Cl. 160-7.000.
Lukashov, Anatoly I.: *See—*
Gokhberg, Pavel Y.; Gorbunov, Boris N.; Khardin, Alexandr P.; Rudkovsky, Vladimir L.; Belyaev, Valentin M.; Lukashov, Anatoly I.; Shpantseva, Ljudmila V.; and Orlyansky, Vitaly V., 4,147,736, Cl. 260-681.000.
Lull Engineering Company, Inc.: *See—*
Frederick, Sherman B.; and Dahlquist, Ernst A., 4,147,263, Cl. 414-718.000.
Lundberg, Robert D.; Makowski, Henry S.; and Bock, Jan, to Exxon Research & Engineering Co. Dry blending of neutralized sulfonated elastomeric powders. 4,147,677, Cl. 260-23.50A.
Lunden, Clarence D., to Boeing Company, The. Low reflectivity radome. 4,148,039, Cl. 343-872.000.
Lunden, Clarence D.; and Buehler, Walter E., to Boeing Company, The. High resolution side-looking airborne radar antenna. 4,148,040, Cl. 343-708.000.
Lusk, Joe F.; and Rood, William H. Tire pressure monitoring system. 4,148,008, Cl. 340-58.000.
Luz, David W.; and Peer, John C., to RCA Corporation. Complementary latching disabling circuit. 4,147,964, Cl. 315-411.000.
Lyman, Joseph, to Cambridge Thermionic Corporation. High speed rotor system. 4,147,396, Cl. 308-10.000.
Lynch, Donald M.: *See—*
Singer, Arnold J.; Lover, Myron J.; Rhodes, William E., III; Bilodeau, William N.; and Lynch, Donald M., 4,147,800, Cl. 424-312.000.
Lynch, Gary J., to Monsanto Company. Zirconium halohydride preparation. 4,147,709, Cl. 260-429.300.
Lysle, Gordon, to Microx Corporation. Apparatus and process for photographically duplicating intelligence existing on photoplastic film. 4,147,429, Cl. 355-133.000.
Lyu, Don: *See—*
Baump, Paul A.; Lyu, Don; Sain, Jerry T.; and Zbriger, Richard A., 4,148,012, Cl. 340-149.00A.
Maasbol, Alfred G.: *See—*
Dulog, Lothar G.; and Maasbol, Alfred G., 4,147,673, Cl. 252-548.000.
Machinefabriek Geurtsen Deventer B.V.: *See—*
Geurtsen, Alfonsus A., 4,147,629, Cl. 210-104.000.
Machleder, Warren H.; and Bollinger, Joseph M., to Rohm and Haas Company. Multipurpose hydrocarbon fuel and lubricating oil additive mixture. 4,147,641, Cl. 252-51.50A.
Machlett Laboratories, Inc., The: *See—*
Caraher, James R.; Rappoport, William M.; DeCou, Donald F.; and Deits, William C., 4,147,950, Cl. 313-181.000.
MacNicol, David D.: *See—*
Brown, Douglas H.; Cross, Ronald J.; and MacNicol, David D., 4,147,735, Cl. 260-674.0WC.
Maeda, Kenji: *See—*
Umezawa, Hamao; Maeda, Kenji; Kondo, Shinichi; and Umezawa, Sumio, 4,147,861, Cl. 536-10.000.
Maffrand, Jean-Pierre, to Parcor. 4,5,6,7-Tetrahydro-thieno[2,3-c]-and [3,2-c]-pyridines, and therapeutic compositions containing the same. 4,147,787, Cl. 424-256.000.
Magee, Thomas J.; Pettijohn, Richard R.; Stewart, Shelley A.; and Thackray, Malcolm, to SRI International. Method of controlled surface texturization of crystalline semiconductor material. 4,147,564, Cl. 148-1.500.
Magers, Thomas A.; and Tabb, David L., to Miles Laboratories, Inc. Test means and method for detecting ketone bodies. 4,147,514, Cl. 23-230.00B.
Magnier, Pierre: *See—*
Rabinovitch, Maurice; and Magnier, Pierre, 4,147,201, Cl. 164-35.000.
Mahlein, Hans: *See—*
Baues, Peter; Mahlein, Hans; Moeckel, Peter; Reichelt, Achim; and Winzer, Gerhard, 4,147,979, Cl. 324-244.000.
Mai, Erich, to Josef Haamann, Firma. Equipment for lifting and depositing cabins, shelters, replacement constructions and the like. 4,147,267, Cl. 414-498.000.
Maier, Dieter. Multiple spindle drilling unit. 4,147,461, Cl. 408-46.000.
Maier, Roe J., Jr., to United States of America, Air Force. Radiation dose rate hardened light detector. 4,148,050, Cl. 357-30.000.
Makar, Francis B., Jr.: *See—*
Webb, Edward A.; Makar, Francis B., Jr.; and Barakitis, Nikolaos, 4,147,952, Cl. 313-220.000.
Makeev, Boris A.: *See—*
Suslin, Vladimir I.; Dubovik, Alexandr I.; Makeev, Boris A.; Pilipenko, Vitaly A.; Lekarev, Zinovy A.; and Kolyshkin, Boris S., 4,147,609, Cl. 204-224.00M.
Makhlouf, Joseph M.; and Porter, Samuel, Jr., to PPG Industries, Inc. Method of preparing dispersions of gelled polymeric microparticles and products produced thereby. 4,147,688, Cl. 260-33.6EP.
Makitalo, Valto J.: *See—*
Lilja, Launo L.; and Makitalo, Valto J., 4,147,535, Cl. 75-74.000.
Makowski, Henry S.: *See—*
Lundberg, Robert D.; Makowski, Henry S.; and Bock, Jan, 4,147,677, Cl. 260-23.50A.
Malacheski, Joseph J.; and Zenda, Richard J. Radiator valved closure. 4,147,273, Cl. 220-204.000.
Maliar, Serge, Jr.: *See—*
Kovanda, Robert J.; Maliar, Serge, Jr.; and Spencer, Robert W., 4,147,657, Cl. 252-313.00S.
Mammino, Joseph; and Jossel, Franklin, to Xerox Corporation. Color electrophotographic developer system employing one carrier having a coating of resin and copper tetra-4-(octadecylsulfonomido)phthalocyanine. 4,147,540, Cl. 96-1.200.
Manchand, Percy S., to Hoffmann-La Roche Inc. Preparation of carotenoids using a $\pi$-allyl complex. 4,147,708, Cl. 260-413.900.
Mandler, Walter, to Ernst Leitz Wetzlar GmbH. Optical sensing system for focusing a reflex camera. 4,147,417, Cl. 354-25.000.
Mann, Joseph K., to Varian Associates, Inc. Apparatus and method for measuring pressures and indicating leaks with optical analysis. 4,147,431, Cl. 356-72.000.
Mannesmann AG.: *See—*
Lather, Dieter; Janssen, Klaus-Uwe; Ries, Karl; Moller, Peter; and Forstermann, Ulrich, 4,147,065, Cl. 73-611.000.
Mansfield, Wilfred P., to National Research Development Corporation. Cylinder head cooling arrangement for internal combustion engines. 4,147,140, Cl. 123-41.770.
Mao, Chung-Ling; and Nudenberg, Walter, to Uniroyal, Inc. Flame-retardant polyurethane compositions. 4,147,678, Cl. 260-28.50R.
Marathon Oil Company: *See—*
Plummer, Mark A.; and Jones, Stanley C., 4,147,637, Cl. 252-8.55D.
Plummer, Mark A., 4,147,638, Cl. 252-8.55D.
Marchesani, Cesare N., to Colgate-Palmolive Company. Wet crack test method for soap bars. 4,147,053, Cl. 73-104.000.
Marconi Company Limited, The: *See—*
Britten, David P., 4,148,037, Cl. 343-846.000.
Marechal, Pierre, to Institut Straumann AG. Copper-zinc-nickel-manganese alloys. 4,147,568, Cl. 148-32.500.
Margotte, Dieter: *See—*
Alewelt, Wolfgang; Margotte, Dieter; Vernaleken, Hugo; and Kassahn, Horst-Gunter, 4,147,707, Cl. 260-37.0SB.
Margulies, Herman, to Sterling Drug, Inc. X-ray film mounts. 4,146,985, Cl. 40-158.00B.
Markus, Henry Z.: *See—*
McAleer, William J.; and Markus, Henry Z., 4,147,772, Cl. 424-89.000.
Marshall, John L.: *See—*
Greene, Ronald W.; and Marshall, John L., 4,147,171, Cl. 128-421.000.
Martin, Ricky. Electronic combination door lock with dead bolt sensing means. 4,148,092, Cl. 361-172.000.
Martin, Robert D.: *See—*
Wester, Douglas J.; and Martin, Robert D., 4,147,061, Cl. 73-341.000.
Marvin Glass & Associates: *See—*
Barlow, Gordon A.; Licitis, Gunars; and Wildman, John R., 4,147,355, Cl. 273-101.100.
Breslow, Jeffrey D., 4,146,978, Cl. 35-77.000.
Erickson, Erick E., 4,147,358, Cl. 273-241.000.
Imatt, Alex, 4,147,361, Cl. 273-271.000.
Masahiko, Mitsutsuka: *See—*
Kotaro, Ishii; Masahiko, Mitsutsuka; and Tomoyuki, Osada, 4,147,332, Cl. 266-44.000.
Maschinenfabrik Andritz Aktiengesellschaft: *See—*
Heissenberger, Otto; Syrowatka, Rupert; and Tutschek, Ernst, 4,147,101, Cl. 100-118.000.
Mascia, Carmen T.; and Hasegawa, Gary K., to Continental Group, Inc., The. Combined charging and product dispensing unit. 4,147,283, Cl. 222-399.000.
Mason, Brian W.: *See—*
Sizmur, Malcolm F.; Brewerton, David; and Mason, Brian W., 4,147,993, Cl. 331-1.00A.
Massachusetts Institute of Technology: *See—*
Baldwin, Jack E.; and Au, Andrew T., 4,147,699, Cl. 260-306.70C.
Mastis, Victor: *See—*
Klimek, Boleslaw M.; and Mastis, Victor, 4,147,394, Cl. 303-118.000.
Masuda, Yukio; and Naoi, Hiroshi, to Kansai Netsukagaku Kabushiki Kaisha; and Tekkosho, Ikio. Sprinkler for vent part of ascension pipe of coke oven. 4,147,595, Cl. 202-241.000.
Matasovic, John L.; and Matasovic, Stella B., executor. Remote control portable wirefeed arc welding system. 4,147,919, Cl. 219-132.000.
Matasovic, Stella B., executor: *See—*
Matasovic, John L.; and Matasovic, Stella B., executor, 4,147,919, Cl. 219-132.000.

Matson, Carl G. Gauging system providing remote readout of liquid levels in gasoline storage tanks. 4,147,893, Cl. 179-2.00A.

Matsuda, Kenji: *See*—
Yasukawa, Shozo; and Matsuda, Kenji, 4,147,887, Cl. 13-18.00B.

Matsui, Ichinosuke. Foldingly collapsible container and holder-stand therefor. 4,147,279, Cl. 222-95.000.

Matsukawa, Hiroharu: *See*—
Kato, Hajime; Igarashi, Akira; Matsukawa, Hiroharu; and Miyamoto, Akio, 4,147,830, Cl. 428-324.000.

Matsunaga, Akira; and Suzuki, Kensuke, to Hitachi, Ltd. Glass-encapsulated semiconductor device containing cylindrical stack of semiconductor pellets. 4,148,056, Cl. 357-73.000.

Matsushita Electric Industrial Co., Ltd.: *See*—
Hayami, Masaaki; and Torikoshi, Seiko, 4,147,862, Cl. 542-415.000.
Iwase, Keizo; Takada, Toshio; and Bando, Yoshichika, 4,147,747, Cl. 264-65.000.
Kiuchi, Mitsuyuki; Mizukawa, Takumi; Amagami, Keizo; and Yoshida, Hirokazu, 4,147,910, Cl. 219-10.49R.
Nishino, Atsushi; Sonetaka, Kazunori; Kimura, Kunio; and Ikeda, Nasaki, 4,147,835, Cl. 428-450.000.
Shiotani, Tomokazu, 4,147,963, Cl. 315-387.000.

Matsushita, Shigetada, to Fuji Electric Co., Ltd. Electromagnetic fluid flowmeter operable with free fluid surface. 4,147,058, Cl. 73-194.0EM.

Mattel, Inc.: *See*—
Molnar, John A.; Stewart, James B.; and Schmidt, Sheldon P., 4,147,133, Cl. 119-55.000.

Maus, Leo D.: *See*—
Ilfrey, William T.; Heilhecker, Joe K.; and Maus, Leo D., 4,147,221, Cl. 175-7.000.

Mayerhoefer, Horst: *See*—
Drake, William O.; Finck, Hans-Werner; Mayerhoefer, Horst; and Mueller, Woflgang H., 4,147,636, Cl. 252-8.100.

Mayhew, Harry E.; and De Shay, Harry W., to All American Industries, Inc. Mobile RPV landing deck. 4,147,317, Cl. 244-116.000.

Mayo, Aryan R. Method and apparatus for feeding a sugar cane mill. 4,147,557, Cl. 127-6.000.

Mazziotti, Philip J.; and Hobson, Donald E., to Dana Corporation. Vehicle drive system. 4,147,225, Cl. 180-44.00R.

McAleer, William J.; and Markus, Henry Z., to Merck & Co., Inc. Vaccine stabilizer. 4,147,772, Cl. 424-89.000.

McCreight, Edward M.; and Thacker, Charles P., to Xerox Corporation. Data transfer system with disk command verification apparatus. 4,148,098, Cl. 364-200.000.

McDonald, Angus, to Buten, Alan Morris. Engine casing support bracket. 4,147,318, Cl. 180-64.00R.

McDonnell Douglas Corporation: *See*—
Kallmeyer, Albert W.; and Holman, Harry A., Jr., 4,147,822, Cl. 428-35.000.

McElreath, Kay E. B., heir: *See*—
Bailey, Kenneth M., deceased; Raymond, Alyce B., heir; Bailey, Bruce K., heir; McElreath, Kay E. B., heir; and Wood, Marsha L. B., heir, 4,147,360, Cl. 273-261.000.

McElreath, Kay Etma Bailey: *See*—
Bailey, Kenneth M., deceased; Raymond, Alyce B., heir; Bailey, Bruce K., heir; McElreath, Kay E. B., heir; and Wood, Marsha L. B., heir, 4,147,360, Cl. 273-261.000.

McGee, John K., to Combustion Engineering, Inc. Hydraulic control assembly. 4,147,325, Cl. 251-25.000.

McGill, Robert W.; and Winiasz, Michael E., to A-T-O, Inc. Adjustable apparatus for case loading and unloading. 4,147,265, Cl. 414-416.000.

McGovern, James R. Round pool table. 4,147,345, Cl. 273-2.000.

McGregor, Harold R. Tag feeding apparatus. 4,147,106, Cl. 101-232.000.

McGregor, Stanley D.: *See*—
Freedman, Harold H.; McGregor, Stanley D.; Yoshimine, Masao; and Kroposki, Lorraine M., 4,147,866, Cl. 544-243.000.

McKinney Manufacturing Company: *See*—
Gwozdz, Joseph W., 4,148,001, Cl. 335-205.000.

McKinzie, Howard; Lester, Joseph E.; and Palilla, Frank C., to GTE Laboratories Incorporated. Sulfur dioxide reduction process utilizing catalysts with spinel structure. 4,147,763, Cl. 423-570.000.

McKlveen, John R.: *See*—
Lipscomb, Walter P.; McKlveen, John R.; and Turner, Garland L., 4,147,749, Cl. 264-167.000.

McKnight, Lee G.: *See*—
Kerns, Becky T.; Logan, Walter; McKnight, Lee G.; Ostermayer, Frederick W., Jr.; and Terry, Milton E., 4,148,089, Cl. 361-119.000.

McLagan, Angus; and Cummings, Kirk B., to General Automation, Inc. Asynchronous priority circuit for controlling access to a bus. 4,148,011, Cl. 340-147.0LP.

McLean, Ronald A. N.: *See*—
Findlay, David M.; and McLean, Ronald A. N., 4,147,626, Cl. 210-52.000.

McMillan, Stephen L., to General Electric Company. Automatic belt tightener. 4,147,070, Cl. 74-242.11C.

McNulty, Patrick J.; and Warner, Harlow L., to Rohm and Haas Company. 6-Oxopyrimidine plant growth regulators. 4,147,528, Cl. 71-92.000.

Mead Corporation, The: *See*—
Nelson, Douglas G., 4,147,380, Cl. 281-29.000.
Stout, James T., 4,147,290, Cl. 229-52.00B.

Mead Johnson & Company: *See*—
Morrow, Duane F., 4,147,805, Cl. 424-330.000.

Meadows, John W.: *See*—
Kahle, Rolf D.; and Meadows, John W., 4,147,422, Cl. 354-299.000.

Med General, Inc.: *See*—
Miller, Curtis H.; Kaldun, Mark R.; and Arp, Robert A., 4,147,969, Cl. 320-2.000.

Medtronic, Inc.: *See*—
Fathauer, George H., 4,147,059, Cl. 73-194.00A.

Mehta, Suresh N.: *See*—
Bennett, Michael C.; and Mehta, Suresh N., 4,147,628, Cl. 210-83.000.

Meiser, Werner; Buchel, Karl H.; Kramer, Wolfgang; and Grewe, Ferdinand, to Bayer Aktiengesellschaft. 1-Substituted-1,2,4-triazole fungicidal compositions and methods for combatting fungi that infect or attack plants. 4,147,791, Cl. 424-269.000.

Melvin, Lawrence S., Jr.: *See*—
Althuis, Thomas H.; Harbert, Charles A.; Johnson, Michael R.; and Melvin, Lawrence S., Jr., 4,147,872, Cl. 546-216.000.

Menasco Manufacturing Company: *See*—
Kendall, Giles A.; and Minick, Robert, 4,147,316, Cl. 244-102.00R.

Mendiratta, Sudhir K., to Olin Corporation. Process for producing pentachloro-nitrobenzene. 4,147,732, Cl. 260-646.000.

Mercier, Carl. Garage door opener. 4,147,073, Cl. 74-424.80R.

Merck & Co., Inc.: *See*—
McAleer, William J.; and Markus, Henry Z., 4,147,772, Cl. 424-89.000.

Merlina, Joseph F.: *See*—
Andrews, Daniel M.; Merlina, Joseph F.; Redmond, John P.; Scheingold, William S.; and Ulbrich, George, 4,147,889, Cl. 174-52.0FP.

Meroni, Umberto, to Societa Italiana Telecomunicazioni Siemens S.p.A. Electronic circuit breaker. 4,148,088, Cl. 361-93.000.

Merrell Toraude et Compagnie: *See*—
Metcalf, Brian W.; and Jung, Michel, 4,147,873, Cl. 546-221.000.

Merrick, George J.; Cook, George E.; and Modglin, Donald D., to Merrick Welding International. Welding torch and supporting apparatus. 4,147,920, Cl. 219-137.630.

Merrick Welding International: *See*—
Merrick, George J.; Cook, George E.; and Modglin, Donald D., 4,147,920, Cl. 219-137.630.

Merrow, Thomas E.: *See*—
Caudel, Edward R.; Wilson, William R.; and Merrow, Thomas E., 4,147,984, Cl. 325-25.000.

Merry, Carl A., to Schaefer Marine Products. Deck cleat. 4,147,122, Cl. 114-218.000.

Meshkov, Jury K.: *See*—
Bystrov, Nikolai M.; Simonov, Anatoly N.; Levin, Alexandr B.; Meshkov, Jury K.; Zakharov, Anatoly A.; and Kolbanev, Alexei V., 4,147,527, Cl. 65-183.000.

Metcalf, Brian W.; and Jung, Michel, to Merrell Toraude et Compagnie. α-Vinyl derivatives of α-amino acids. 4,147,873, Cl. 546-221.000.

Metzger, Karl G.: *See*—
Konig, Hans-Bodo; Metzger, Karl G.; Preiss, Michael; and Schrock, Wilfried, 4,147,693, Cl. 424-246.000.

Meyer, Engelbert A., to USM Corporation. Molding clip and method of assembly. 4,147,005, Cl. 52-397.000.

Miasek, Peter G.; and Dugan, John J., to Imperial Oil Enterprises Ltd. Regeneration of alkali metal sulfides from alkali metal hydrosulfides. 4,147,611, Cl. 208-108.000.

Miasek, Peter G.; and Dugan, John J., to Imperial Oil Enterprises Ltd. Regeneration of alkali metal sulfides from alkali metal hydrosulfides. 4,147,612, Cl. 208-108.000.

Michaelis, Klaus P.; and Wirth, Hermann O., to Ciba-Geigy AG. Additives for lubricants. 4,147,666, Cl. 252-48.200.

Micro Consultants Limited: *See*—
Taylor, Richard J., 4,148,070, Cl. 358-160.000.

Microfibres, Inc.: *See*—
Casey, James P., 4,147,813, Cl. 427-27.000.

Microfusion S.A.: *See*—
Rabinovitch, Maurice; and Magnier, Pierre, 4,147,201, Cl. 164-35.000.

Microlife Technics, Inc.: *See*—
Gryczka, Alfred J.; and Shah, Ramesh B., 4,147,807, Cl. 426-56.000.

Microx Corporation: *See*—
Lysle, Gordon, 4,147,429, Cl. 355-133.000.

Middleton, Scott W.; Murray, Lee J., Jr.; and Felstein, Steven R., to American Can Company. Polyester coated paperboard for forming food containers and process for producing the same. 4,147,836, Cl. 428-481.000.

Miki, Kazuyoshi, to Hitachi, Ltd. Fuel assembly of fast breeder reactor. 4,147,591, Cl. 176-81.000.

Mikkelsen, Bent E., to F. L. Smidth & Co. Roller mill. 4,147,308, Cl. 241-117.000.

Milburn, George; and Chetter, John, to British Nuclear Fuels Ltd. Powder compacting presses. 4,147,489, Cl. 425-355.000.

Milburn, William W., Jr., to O'Rourke, Thomas W. Method and structure for solar heating. 4,147,300, Cl. 237-1.00A.

Miles Laboratories, Inc.: *See*—
Magers, Thomas A.; and Tabb, David L., 4,147,514, Cl. 23-230.00B.

Miller, Curtis H.; Kaldun, Mark R.; and Arp, Robert A., to Med General, Inc. Battery pack charger and tester. 4,147,969, Cl. 320-2.000.

Miller, Eric M., to Tridar. Speakerphone with dynamic level discriminator. 4,147,892, Cl. 179-1.0HF.

Miller, Norman L.: *See*—
Heckles, John S.; and Miller, Norman L., 4,147,686, Cl. 260-31.80R.

Miller, Ronald E., to Aluminum Company of America. Method and

apparatus for removing surface contaminants from metallic scrap. 4,147,531, Cl. 75-44.00S.
Miller, Wendell S. Magnetic quadrapole antenna. 4,148,036, Cl. 343-788.000.
Milliken Research Corporation: *See—*
Oakes, Ralph C., 4,147,020, Cl. 57-289.000.
Mills, John E.: *See—*
Kende, Andrew S.; Mills, John E.; and Tsay, Yuh-Geng, 4,147,706, Cl. 260-365.000.
Milton, Clare L., Jr., to Roper Corporation. System for control of thermal potential. 4,147,502, Cl. 432-72.000.
Mimura, Koji: *See—*
Setsuie, Takashi; Mimura, Koji; and Okamura, Kiyonobu, 4,147,574, Cl. 156-62.400.
Mimura, Masataka: *See—*
Kamada, Masahiro; and Mimura, Masataka, 4,147,876, Cl. 560-37.000.
Mine, Kiyomitsu: *See—*
Habu, Teiji; Nakajima, Tomio; Sakamoto, Eiichi; Fujimori, Noboru; and Mine, Kiyomitsu, 4,147,542, Cl. 96-27.00E.
Mine Safety Appliances Company: *See—*
Smith, Wayne L.; and Wolf, Roger P., 4,147,524, Cl. 55-521.000.
Minick, Robert: *See—*
Kendall, Giles A.; and Minick, Robert, 4,147,316, Cl. 244-102.00R.
Ministry of International Trade & Industry: *See—*
Osumi, Yasuaki; Suzuki, Hiroshi; Kato, Akihiko; Nakane, Masanori; and Miyake, Yoshizo, 4,147,536, Cl. 75-134.00F.
Minnesota Mining and Manufacturing Company: *See—*
Yapel, Anthony F., Jr., 4,147,767, Cl. 424-22.000.
Minolta Camera Kabushiki Kaisha: *See—*
Shimomura, Masaichi; and Horimoto, Mitsuaki, 4,147,410, Cl. 350-184.000.
Minor, William H.: *See—*
Garbelman, David L.; Minor, William H.; and Shaw, Arthur G., 4,147,436, Cl. 366-25.000.
Miracle, Billy D.: *See—*
Sims, David J.; and Miracle, Billy D., 4,147,413, Cl. 350-253.000.
Mishark, Joseph E.; Peters, Robert N.; and Pyszel, Kenneth S., to Computer Peripherals, Inc. Sliding code disc reader and detent therefor for dual pitch web feeding. 4,147,440, Cl. 400-611.000.
Missale, Maria; and Spector, George. Toy soda jet dispenser with moving display. 4,147,281, Cl. 222-192.000.
Mita Industrial Company, Ltd.: *See—*
Miyoshi, Hideo; Shibata, Kiyoshi; Fukuoka, Shogo; and Aizawa, Tatsuo, 4,147,426, Cl. 355-3.0SH.
Mitsubishi Paper Mills, Ltd.: *See—*
Tanaka, Akira; Nakatani, Mamoru; and Yoshida, Akio, 4,147,554, Cl. 96-130.000.
Mitsubishi Petrochemical Company Limited: *See—*
Aritomi, Mitsutoshi, 4,147,675, Cl. 260-22.0CB.
Mitsubishi Rayon Company, Limited: *See—*
Setsuie, Takashi; Mimura, Koji; and Okamura, Kiyonobu, 4,147,574, Cl. 156-62.400.
Mitsui Kinzoku Engineering Service Co., Ltd.: *See—*
Murakami, Yoshio; and Nakazawa, Takezo, 4,147,468, Cl. 415-213.00R.
Mitsui Mining & Smelting Co., Ltd.: *See—*
Murakami, Yoshio; and Nakazawa, Takezo, 4,147,468, Cl. 415-213.00R.
Miura, Motohisa; and Ito, Mikiji, to Nippondenso Co., Ltd. Secondary air supply system for internal combustion engines. 4,147,033, Cl. 60-290.000.
Miura, Tomohiro, to Shoketsu Kinzoku Kogyo Co., Ltd. Pressure governor valve equipped with flow control valve. 4,147,179, Cl. 137-599.000.
Miyadera, Tetsuo; Nagano, Mitsuo; and Sugawara, Shinichi, to Sankyo Company Limited. 7-D-(−)-mandelamido-3-(1-methyl-1H-tetrazol-5-yl)vinyl-3-cephem-4-carboxylic acid. 4,147,863, Cl. 542-436.000.
Miyakawa, Eiji, to Miyakawa Industry Company Limited. Method for piercing doubling plate for H-beam and tool for processing doubling plate for H-beam. 4,147,460, Cl. 408-1.00R.
Miyakawa Industry Company Limited: *See—*
Miyakawa, Eiji, 4,147,460, Cl. 408-1.00R.
Miyake, Yoshizo: *See—*
Osumi, Yasuaki; Suzuki, Hiroshi; Kato, Akihiko; Nakane, Masanori; and Miyake, Yoshizo, 4,147,536, Cl. 75-134.00F.
Miyamoto, Akio: *See—*
Kato, Hajime; Igarashi, Akira; Matsukawa, Hiroharu; and Miyamoto, Akio, 4,147,830, Cl. 428-324.000.
Miyoshi, Hideo; Shibata, Kiyoshi; Fukuoka, Shogo; and Aizawa, Tatsuo, to Mita Industrial Company, Ltd. Electrostatic photographic copying machine. 4,147,426, Cl. 355-3.0SH.
Mizukawa, Takumi: *See—*
Kiuchi, Mitsuyuki; Mizukawa, Takumi; Amagami, Keizo; and Yoshida, Hirokazu, 4,147,910, Cl. 219-10.49R.
Mizuki, Eiichi: *See—*
Kubotera, Kikuo; Mizuki, Eiichi; Satomura, Masato; Iwano, Haruhiko; and Fujiwara, Tadahiro, 4,147,543, Cl. 96-29.00R.
Mizzi, John V. Air propellant-aerosol dispenser and compressor. 4,147,284, Cl. 222-401.000.
Mobil Oil Corporation: *See—*
Breidt, Peter, Jr.; Higgins, Thomas W.; Nahmias, A. Michael; and Weiner, Milton L., 4,147,827, Cl. 428-218.000.
Nace, Donald M., 4,147,617, Cl. 208-74.000.
Patton, Bobbie J., 4,147,223, Cl. 175-40.000.
Modell, Michael, to Arthur D. Little, Inc. Wastewater treatment with desorbing of an adsorbate from an adsorbent with a solvent in the near critical state. 4,147,624, Cl. 210-32.000.
Modglin, Donald D.: *See—*
Merrick, George J.; Cook, George E.; and Modglin, Donald D., 4,147,920, Cl. 219-137.630.
Moeckel, Peter: *See—*
Baues, Peter; Mahlein, Hans; Moeckel, Peter; Reichelt, Achim; and Winzer, Gerhard, 4,147,979, Cl. 324-244.000.
Moellmann, Heinz F., to Avco Corporation. Dual cycle gas turbine engine system. 4,147,024, Cl. 60-39.150.
Mojonnier Bros. Co.: *See—*
Kurczak, Walter; and Anthony, Richard, 4,147,248, Cl. 198-358.000.
Mokhov, Evgeny N.: *See—*
Vodakov, Jury A.; and Mokhov, Evgeny N., 4,147,572, Cl. 148-175.000.
Molins Limited: *See—*
Clarke, Peter A., 4,147,247, Cl. 198-347.000.
Moller, Peter: *See—*
Lather, Dieter; Janssen, Klaus-Uwe; Ries, Karl; Moller, Peter; and Forstermann, Ulrich, 4,147,065, Cl. 73-611.000.
Moller, Richard W., to HydReclaim Corporation. Apparatus and method for mixing fluffy and rigid plastics materials. 4,148,100, Cl. 366-150.000.
Molnar, John A.; Stewart, James B.; and Schmidt, Sheldon P., to Mattel, Inc. Dispenser device for small animal food or the like. 4,147,133, Cl. 119-55.000.
Monsanto Company: *See—*
Crutchfield, Marvin M.; and Lannert, Kent P., 4,147,702, Cl. 260-340.600.
Franz, John E., 4,147,719, Cl. 260-501.120.
Lynch, Gary J., 4,147,709, Cl. 260-429.300.
Petrovich, John P.; and Taylor, David L., 4,147,586, Cl. 162-135.000.
Rapko, John N., 4,147,654, Cl. 252-186.000.
Montedison S.p.A.: *See—*
Bornengo, Mario; and Bacciarelli, Sergio, 4,147,697, Cl. 546-258.000.
Montgomery, Rex; and Chiang, Chao-Kuo, to University of Iowa Research Foundation. Process for the extraction and purification of cesalin. 4,147,691, Cl. 260-112.00R.
Monticelli, Dennis M., to National Semiconductor Corporation. Comparator with signal related adaptive bias. 4,147,944, Cl. 307-362.000.
Moore, Jerrell O. Soccer retriever. 4,147,353, Cl. 273-95.00A.
Moore, Kenneth L.: *See—*
Wood, Stanley E.; Moore, Kenneth L.; and Black, William L., 4,147,055, Cl. 73-167.000.
Moore, M. Samuel; and Paluka, Charles F., to Semco Instruments, Inc. Engine load sharing control system. 4,147,035, Cl. 60-711.000.
Moore Products Co.: *See—*
Goble, William M., 4,147,968, Cl. 318-685.000.
Moore, Randall W.: *See—*
Haas, Steven L.; Fonteneau, Norman O.; and Moore, Randall W., 4,148,096, Cl. 362-252.000.
Moorman, Edward W.: *See—*
Scribner, Jack B.; Moorman, Edward W.; and Payne, James S., 4,147,071, Cl. 74-409.000.
Moran, George A., to ACF Industries, Incorporated. Metallic seals for ball valve. 4,147,327, Cl. 251-174.000.
Mori, Shigeo; Murakami, Fumikazu; Hara, Yoshiaki; Horikoshi, Ichiro; and Takahashi, Sohya, to Kabushiki Kaisha Daini Seikosha. Broad-band electromagnetic soundsource with differently tuned diaphragms. 4,147,899, Cl. 179-116.000.
Morimoto, Kiyoshi, to Futaba Denshi Kogyo K. K. Method of depositing III–V compounds on group IV element wafers by the cluster ion technique. 4,147,573, Cl. 148-175.000.
Morimoto, Yukihiko: *See—*
Yamauchi, Kiaki; Morimoto, Yukihiko; Sasaki, Toshikatu; and Nakai, Katsumi, 4,147,660, Cl. 252-412.000.
Morinaga Milk Industry Co., Ltd.: *See—*
Ogasa, Katsuhiro, 4,147,773, Cl. 424-93.000.
Morio, Minoru: *See—*
Okada, Hidehiko; Morio, Minoru; Kambara, Masahiro; and Kubota, Yukio, 4,148,082, Cl. 360-77.000.
Morita, Isamu; Inoue, Hidehiko; and Ohashi, Yasuo, to Honda Giken Kogyo Kabushiki Kaisha. Telescopic front fork construction for motorcycle. 4,147,371, Cl. 280-276.000.
Morita, Yoshiyuki: *See—*
Ito, Masami; Saito, Tsutomu; and Morita, Yoshiyuki, 4,147,148, Cl. 123-179.00L.
Moronvalle, Chantal: *See—*
d'Auria, Luigi; Jacques, Andre; and Moronvalle, Chantal, 4,147,403, Cl. 350-96.180.
Morrette, Richard A.: *See—*
Dickson, Andrew C.; and Morrette, Richard A., 4,147,487, Cl. 425-174.400.
Morris, Charles F., administrator: *See—*
Appleby, J. Robert; Horvath, Frank P.; and Morris, William J., deceased, 4,147,462, Cl. 408-80.000.
Morris, Harold D.: *See—*
Bower, Gerald S.; Peters, Rex B.; and Morris, Harold D., 4,147,063, Cl. 73-504.000.
Morris, William J., deceased: *See—*
Appleby, J. Robert; Horvath, Frank P.; and Morris, William J., deceased, 4,147,462, Cl. 408-80.000.
Morrow, Duane F., to Mead Johnson & Company. Alkylthiophenox-

yalkylamines and the pharmaceutical use thereof. 4,147,805, Cl. 424-330.000.
Morse, Robert L., to Tecumseh Products Company. Refrigeration system and method with compressor mounted accumulator. 4,147,479, Cl. 417-540.000.
Moser, Jessie L.; and Shoemaker, John R., to AMP Incorporated. Flat cable connector assembly. 4,147,399, Cl. 339-99.00R.
Moskalev, Evgeny V.: *See*—
Pronko, Vladimir G.; Onosovsky, Evgeny V.; Chuvpilo, Albert V.; Zhuravleva, Irina N.; Korneev, Viktor A.; Klimenkov, Dmitry A.; Smirnova, Galina M.; Usanov, Vladimir V.; Ivanov, Jury I.; Chernyshev, Boris A.; Nikitkin, Vasily D.; Nikolaev, Anatoly F.; Trizno, Maya S.; Karkozov, Valery G.; Verkhoglyadova, Tatyana J.; Moskalev, Evgeny V.; and Yakovleva, Lidia I., 4,147,210, Cl. 165-165.000.
Moss, Marvin: *See*—
Heckman, Richard C.; and Moss, Marvin, 4,147,938, Cl. 250-506.000.
Motokawa, Shoichi: *See*—
Endo, Tomizo; Sumida, Yutaka; Kawahara, Toru; Ohtake, Masaichi; Motokawa, Shoichi; Nagayama, Keiji; Shigeta, Masatomo; Hozuma, Hiroshi; Tomizawa, Masaharu; and Kikuchi, Hideo, 4,147,753, Cl. 422-202.000.
Motoren- und Turbinen-Union Friedrichshafen GmbH: *See*—
Leicht, Werner; and Ruetz, Georg, 4,147,467, Cl. 415-196.000.
Motoren-und Turbinen-Union Munich GmbH: *See*—
Weiler, Wolfgang, 4,147,026, Cl. 60-39.080.
Motorola, Inc.: *See*—
Davis, William F., 4,147,992, Cl. 330-288.000.
Price, John J., 4,147,971, Cl. 323-4.000.
Mueller, Gerd, to JENAer Glaswerk Schott & Gen. Gas discharge lamp having a double electrode arrangement. 4,147,951, Cl. 313-220.000.
Mueller, Max A.: *See*—
Holmes, Curtis F.; and Mueller, Max A., 4,147,842, Cl. 429-101.000.
Mueller, Woflgang H.: *See*—
Drake, William O.; Finck, Hans-Werner; Mayerhoefer, Horst; and Mueller, Woflgang H., 4,147,636, Cl. 252-8.100.
Muhlhofer, Ernst: *See*—
Kratel, Gunter; Stohr, Gunter; Eberle, Ludwig; and Muhlhofer, Ernst, 4,147,760, Cl. 423-336.000.
Mulcahy, Harry W., to Amsted Industries Incorporated. Braking system and method for railroad truck. 4,147,237, Cl. 188-52.000.
Muller-Axt, Friedrich: *See*—
Reinke, Friedhelm; Emde, Friedhelm; Geisel, Herbert; Gies, Rolf; Muller-Axt, Friedrich; Lange, Klaus; and Schoenen, Manfred, 4,147,569, Cl. 148-128.000.
Muller, Hans R., to Sundstrand Data Control, Inc. Multi-segment head-up display for aircraft. 4,147,056, Cl. 73-178.00T.
Muller, Jurgen, to AGFA-Gevaert AG. Apparatus for cleaning and developing dielectric receptor sheets. 4,147,128, Cl. 118-652.000.
Mullins, Max. Compatible angled gear system. 4,147,072, Cl. 74-416.000.
Mulner, Manfred: *See*—
Siebenhofer, Gottfried; Mulner, Manfred; and Arbeithuber, Walter, 4,147,391, Cl. 299-75.000.
Mundel, Erwin, to Petersen, Leif Tage. Gas leakage indication device. 4,147,907, Cl. 200-61.030.
Mundipharma, AG: *See*—
Kelly, William, deceased; Kelly, John, personal representative; and Halpein, Alfred, 4,147,776, Cl. 424-175.000.
Munger, Stanley H.: *See*—
Finnicum, Loren T.; Munger, Stanley H.; and Novak, Donald P., 4,147,551, Cl. 96-94.00R.
Munzel, Howard E.; and Queener, Carl A., to International Business Machines Corporation. Fluorinated polymer coated carrier particles. 4,147,834, Cl. 428-407.000.
Murakami, Fumikazu: *See*—
Mori, Shigeo; Murakami, Fumikazu; Hara, Yoshiaki; Horikoshi, Ichiro; and Takahashi, Sohya, 4,147,899, Cl. 179-116.000.
Murakami, Yoshiaki: *See*—
Kobayashi, Akio; Shimohiro, Yoshiyuki; Shimizu, Kisaburou; and Murakami, Yoshiaki, 4,147,512, Cl. 8-165.000.
Murakami, Yoshio; and Nakazawa, Takezo, to Mitsui Mining & Smelting Co., Ltd.; and Mitsui Kinzoku Engineering Service Co., Ltd. Impeller type pump having seal means and protective means. 4,147,468, Cl. 415-213.00R.
Murase, Ichiki: *See*—
Sano, Takezo; Shimomura, Takatoshi; Sasaki, Masao; and Murase, Ichiki, 4,147,745, Cl. 264-22.000.
Murray, Lee J., Jr.: *See*—
Middleton, Scott W.; Murray, Lee J., Jr.; and Felstein, Steven R., 4,147,836, Cl. 428-481.000.
Mustich, Giuseppe, to Inverni Della Beffa S.p.A. Sericosides and method of use. 4,147,777, Cl. 424-181.000.
Mutton, Jon C.; and Unger, Peter J., to Tektronix, Inc. Electrographic copier with one-piece belt and styli. 4,148,042, Cl. 346-155.000.
Myers, Jimmy D.: *See*—
Bridwell, John W.; and Myers, Jimmy D., 4,147,442, Cl. 403-4.000.
Naarden International, N.V.: *See*—
Boelens, Harmannus; and Wobben, Hendrik J., 4,147,671, Cl. 252-522.000.
Nace, Donald M., to Mobil Oil Corporation. Processing hydrocarbon feed of high carbon residue and high metals content. 4,147,617, Cl. 208-74.000.
Nadeau, Georges E. Delimbing apparatus. 4,147,190, Cl. 144-2.00Z.
Naegelin, Roland, to Sulzer Brothers Limited. Heat exchanger. 4,147,208, Cl. 165-159.000.
Naeser, Helmut; and Nusser, Alban, to Siemens Aktiengesellschaft. Device for fixing a toner image. 4,147,922, Cl. 219-216.000.
Naganawa, Hiroshi: *See*—
Umezawa, Hamao; Takeuchi, Tomio; Hamada, Masa; Ishizuka, Masaaki; Naganawa, Hiroshi; Oki, Toshikazu; and Inui, Taiji, 4,147,778, Cl. 424-181.000.
Nagano, Mitsuo: *See*—
Miyadera, Tetsuo; Nagano, Mitsuo; and Sugawara, Shinichi, 4,147,863, Cl. 542-436.000.
Nagano, Tetsuro, to Toyota Jidosha Kogyo Kabushiki Kaisha. Exhaust gas recirculation system in an internal combustion engine. 4,147,141, Cl. 123-119.00A.
Nagashima, Nozomu: *See*—
Kurata, Junichi; Ishikawa, Kazushige; and Nagashima, Nozomu, 4,147,365, Cl. 274-9.0RA.
Nagatsu, Toshiharu; and Sakakibara, Shumpei, to Ajinomoto Co., Inc. Novel dipeptide derivatives, and method of measuring enzymatic activity. 4,147,692, Cl. 260-112.50R.
Nagayama, Keiji: *See*—
Endo, Tomizo; Sumida, Yutaka; Kawahara, Toru; Ohtake, Masaichi; Motokawa, Shoichi; Nagayama, Keiji; Shigeta, Masatomo; Hozuma, Hiroshi; Tomizawa, Masaharu; and Kikuchi, Hideo, 4,147,753, Cl. 422-202.000.
Nagino, Hiroshi: *See*—
Ogasawara, Toshiya; Kubo, Norimasa; Nagino, Hiroshi; Takeda, Mamoru; and Ochiishi, Masanori, 4,147,452, Cl. 405-134.000.
Nahmias, A. Michael: *See*—
Breidt, Peter, Jr.; Higgins, Thomas W.; Nahmias, A. Michael; and Weiner, Milton L., 4,147,827, Cl. 428-218.000.
Naito, Ryoichi; Inahara, Hirohisa; and Shiino, Satoru, to Green Cross Corporation, The. Method for preventing intestinal diverticulum with expanded fiber bundles of asparagus. 4,147,779, Cl. 424-195.000.
Nakagawa, Kazuyuki; and Oshiro, Yasuo, to Otsuka Pharmaceutical Co., Ltd. 3,4-Dihydrocarbostyril derivatives and process for preparing the same. 4,147,869, Cl. 544-363.000.
Nakagawa, Kiyoshi; Toorisawa, Soichi; Ibe, Hiroyuki; Nakashima, Shigeaki; and Hara, Yasuhiko, to Hitachi, Ltd. Method and apparatus for automatically inspecting and correcting masks. 4,148,065, Cl. 358-101.000.
Nakai, Katsumi: *See*—
Yamauchi, Kiaki; Morimoto, Yukihiko; Sasaki, Toshikatu; and Nakai, Katsumi, 4,147,660, Cl. 252-412.000.
Nakajima, Hironori: *See*—
Ando, Tsuneo; and Nakajima, Hironori, 4,147,494, Cl. 431-71.000.
Nakajima, Tomio: *See*—
Habu, Teiji; Nakajima, Tomio; Sakamoto, Eiichi; Fujimori, Noboru; and Mine, Kiyomitsu, 4,147,542, Cl. 96-27.00E.
Nakamura, Taku: *See*—
Karino, Yukio; and Nakamura, Taku, 4,147,548, Cl. 96-77.000.
Nakane, Masanori: *See*—
Osumi, Yasuaki; Suzuki, Hiroshi; Kato, Akihiko; Nakane, Masanori; and Miyake, Yoshizo, 4,147,536, Cl. 75-134.00F.
Nakashima, Shigeaki: *See*—
Nakagawa, Kiyoshi; Toorisawa, Soichi; Ibe, Hiroyuki; Nakashima, Shigeaki; and Hara, Yasuhiko, 4,148,065, Cl. 358-101.000.
Nakatani, Mamoru: *See*—
Tanaka, Akira; Nakatani, Mamoru; and Yoshida, Akio, 4,147,554, Cl. 96-130.000.
Nakatsuka, Hisayoshi, to Namiki Precision Jewel Co., Ltd. Non-vibration tone arm. 4,147,364, Cl. 274-1.00R.
Nakazawa, Takezo: *See*—
Murakami, Yoshio; and Nakazawa, Takezo, 4,147,468, Cl. 415-213.00R.
Nalco Chemical Company: *See*—
Albanese, Vincent M., 4,147,521, Cl. 55-2.000.
Kekish, George T., 4,147,539, Cl. 75-257.000.
Namiki Precision Jewel Co., Ltd.: *See*—
Nakatsuka, Hisayoshi, 4,147,364, Cl. 274-1.00R.
Namiki, Ryoichi, to Ricoh Company, Ltd. Fixing roller. 4,147,832, Cl. 428-375.000.
Naoi, Hiroshi: *See*—
Masuda, Yukio; and Naoi, Hiroshi, 4,147,595, Cl. 202-241.000.
Naramore, Raymond A., to Xerox Corporation. Vibrating tamper. 4,147,342, Cl. 271-221.000.
Narayan, Jagdish; and Young, Rosa T., to United States of America, Energy. Method for forming p-n junctions and solar-cells by laser-beam processing. 4,147,563, Cl. 148-1.500.
Natalizia, Angelo, to International Telephone & Telegraph Corp. Non-spherical ball valve. 4,147,326, Cl. 251-162.000.
Nathanson, Harvey C.; and Thomas, Richard N., to Westinghouse Electric Corp. Radiant energy sensor. 4,148,052, Cl. 357-30.000.
National Can Corporation: *See*—
Tovey, John M., 4,146,968, Cl. 33-178.00R.
National Patent Development Corporation: *See*—
Levy, Didya D.; and Ronel, Samuel H., 4,147,764, Cl. 424-1.000.
National Research Development Corporation: *See*—
Brown, Douglas H.; Cross, Ronald J.; and MacNicol, David D., 4,147,735, Cl. 260-674.0WC.
Mansfield, Wilfred P., 4,147,140, Cl. 123-41.770.
National Semiconductor Corporation: *See*—
Monticelli, Dennis M., 4,147,944, Cl. 307-362.000.
National Union Electric Corporation: *See*—
Brooks, Joseph F.; and Elderton, Robert W., 4,147,470, Cl. 416-95.000.

Naylor, Thomas K.: *See*—
Dokus, Edwin A.; and Naylor, Thomas K., 4,147,990, Cl. 330-11.000.
NCR Canada Ltd. - NCR Canada Ltee: *See*—
Shiau, Chin-Chih, 4,148,010, Cl. 340-146.30C.
NCR Corporation: *See*—
Aiena, Peter P., 4,147,967, Cl. 318-341.000.
Lauffer, Donald K.; and Ward, William P., 4,148,099, Cl. 365-226.000.
Nelson, Douglas G., to Mead Corporation, The. Continuous flexible hinge for paperboard and the like. 4,147,380, Cl. 281-29.000.
Nelson Industries, Inc.: *See*—
Ormond, Theodore W.; and Kicinski, Kenneth J., 4,147,230, Cl. 181-231.000.
Nelson, John M.: *See*—
Stenner, Irving H.; and Nelson, John M., 4,147,272, Cl. 220-89.00B.
Nelson, Larry J.; and Fortuna, John E., II, to Knape & Vogt Manufacturing Co. Drawer slide mount employing a slide element and cooperative clip. 4,147,393, Cl. 308-3.600.
Nelson Research & Development Company: *See*—
Dea, Frank J.; Fairbairn, William D.; and Novack, Michael W., 4,147,769, Cl. 424-47.000.
Nelson, Warren A., to Philip A. Hunt Chemical Corp. Etching of metal. 4,147,581, Cl. 156-345.000.
New Hermes, Incorporated: *See*—
Levine, Jack W.; and Bonheim, Hans, 4,146,966, Cl. 33-24.00B.
Neway Manufacturing, Inc.: *See*—
Appleby, J. Robert; Horvath, Frank P.; and Morris, William J., deceased, 4,147,462, Cl. 408-80.000.
Newland, Gordon C.: *See*—
Pacifici, James G.; and Newland, Gordon C., 4,147,603, Cl. 204-159.120.
Newman, Richard W.; and Connors, John D., to Welch Allyn, Inc. Medical instrument and handle assembly. 4,147,163, Cl. 128-9.000.
Newton, Eric W.; and Scott, Geoffrey, to Champion Associated Weavers Limited. Flat screen lift and interrupt means. 4,147,103, Cl. 101-115.000.
Nguyen, Huu T.: *See*—
Dubois, Jean-Claude; Nguyen, Huu T.; and Zann, Annie, 4,147,655, Cl. 252-299.000.
Nieman, John R., to Caterpillar Tractor Co. Elongate composite article. 4,147,837, Cl. 428-548.000.
Nienhaus. Alan M.: *See*—
Smith, Larry C.; and Nienhaus, Alan M., 4,147,367, Cl. 277-152.000.
Nikitkin, Vasily D.: *See*—
Pronko, Vladimir G.; Onosovsky, Evgeny V.; Chuvpilo, Albert V.; Zhuravleva, Irina N.; Korneev, Viktor A.; Klimenkov, Dmitry A.; Smirnova, Galina M.; Usanov, Vladimir V.; Ivanov, Jury I.; Chernyshev, Boris A.; Nikitkin, Vasily D.; Nikolaev, Anatoly F.; Trizno, Maya S.; Karkozov, Valery G.; Verkhoglyadova, Tatyana J.; Moskalev, Evgeny V.; and Yakovleva, Lidia I., 4,147,210, Cl. 165-165.000.
Nikolaev, Anatoly F.: *See*—
Pronko, Vladimir G.; Onosovsky, Evgeny V.; Chuvpilo, Albert V.; Zhuravleva, Irina N.; Korneev, Viktor A.; Klimenkov, Dmitry A.; Smirnova, Galina M.; Usanov, Vladimir V.; Ivanov, Jury I.; Chernyshev, Boris A.; Nikitkin, Vasily D.; Nikolaev, Anatoly F.; Trizno, Maya S.; Karkozov, Valery G.; Verkhoglyadova, Tatyana J.; Moskalev, Evgeny V.; and Yakovleva, Lidia I., 4,147,210, Cl. 165-165.000.
Nikolaeva, Ljudmila A.: *See*—
Golovchinskaya, Elena S.; Chernov, Vladimir A.; Chaman, Elena S.; Nikolaeva, Ljudmila A.; and Korsunsky, Vyacheslav S., 4,147,867, Cl. 544-244.000.
Nilsson, Uno B., to Bruzaholms Maskiner AB. Feed mechanism for log sawing machine. 4,147,259, Cl. 414-745.000.
Nippon Denso Company Limited: *See*—
Ito, Masami; Saito, Tsutomu; and Morita, Yoshiyuki, 4,147,148, Cl. 123-179.00L.
Nippon Electric Co., Ltd.: *See*—
Horigome, Toshinori; and Kageyama, Takao, 4,147,956, Cl. 315-3.600.
Shohata, Nobuaki; Ohno, Tomeji; Ikeda, Shigeru; Fukushima, Takaki; Igarashi, Ryuji; and Yoshida, Jyun-Ichiro, 4,147,670, Cl. 252-519.000.
Watanabe, Yoshio; and Saburi, Akio, 4,147,894, Cl. 179-15.00A.
Nippon Gakki Seizo Kabushiki Kaisha: *See*—
Tomisawa, Norio, 4,148,017, Cl. 340-365.00S.
Nippon Shokubai Kagaku Kogyo Co. Ltd.: *See*—
Shimizu, Noboru; Yanagisawa, Isao; Takata, Masahiro; and Sato, Takahisa, 4,147,885, Cl. 562-535.000.
Nippon Soken, Inc.: *See*—
Katahira, Eturou; Yamaguchi, Shunzo; Kida, Masashi; and Ishida, Yasuhiko, 4,147,030, Cl. 60-276.000.
Kawai, Hisasi; and Ina, Toshikazu, 4,148,090, Cl. 361-152.000.
Kohama, Tokio; Obayashi, Hideki; Ozaki, Tadashi; and Nohira, Hidetaka, 4,146,986, Cl. 60-290.000.
Noguchi, Masaaki; Bunda, Tsuchio; and Tanaka, Taro, 4,147,136, Cl. 123-3.000.
Nippon Steel Corporation: *See*—
Nishitani, Teruyuki, 4,147,911, Cl. 219-10.55M.
Nippon Telegraph & Telephone Public Corp.: *See*—
Watanabe, Yoshio; and Saburi, Akio, 4,147,894, Cl. 179-15.00A.
Nippondenso Co., Ltd.: *See*—
Miura, Motohisa; and Ito, Mikiji, 4,147,033, Cl. 60-290.000.
Nojiri, Tadao; and Sugiura, Akio, 4,147,295, Cl. 235-463.000.
Yamawaki, Masao; Aoki, Katsuo; Oka, Yoshio; Suzuki, Takao; Amano, Masahiko; Ozaki, Hideki; and Ishihara, Osamu, 4,147,432, Cl. 118-49.100.
Nishida, Fumihiko: *See*—
Nishikawa, Yukio; Ono, Yoshio; and Nishida, Fumihiko, 4,147,428, Cl. 355-88.000.
Nishikawa, Yukio; Ono, Yoshio; and Nishida, Fumihiko, to Dainippon Screen Seizo Kabushiki Kaisha. Device for positioning films on base sheets. 4,147,428, Cl. 355-88.000.
Nishimura, Katsuo: *See*—
Sekiya, Fukuo; Ebihara, Heihachiro; and Nishimura, Katsuo, 4,148,015, Cl. 340-763.000.
Nishino, Atsushi; Sonetaka, Kazunori; Kimura, Kunio; and Ikeda, Nasaki, to Matsushita Electric Industrial Co., Ltd. Article having self-cleaning coating. 4,147,835, Cl. 428-450.000.
Nishitani, Teruyuki, to Nippon Steel Corporation. Method for sintering refractories and an apparatus therefor. 4,147,911, Cl. 219-10.55M.
Nissan Motor Company, Limited: *See*—
Fujiki, Norio, 4,148,028, Cl. 343-7.0VM.
Fujioka, Kazuyoshi, 4,147,242, Cl. 192-4.00A.
Okabayashi, Shigeru; Baba, Kousaku; and Endo, Hiroshi, 4,148,007, Cl. 340-52.00F.
Tanuma, Takeshi; and Harada, Masanori, 4,147,031, Cl. 60-278.000.
NL Industries, Inc.: *See*—
Whittaker, Charles B., Jr., 4,147,088, Cl. 85-41.000.
Nogami, Kouji: *See*—
Fukuma, Nobuo; Kato, Yoshito; and Nogami, Kouji, 4,147,965, Cl. 318-256.000.
Noguchi, Masaaki; Bunda, Tsuchio; and Tanaka, Taro, to Nippon Soken, Inc. Fuel reforming system for an internal combustion engine. 4,147,136, Cl. 123-3.000.
Noguchi, Masamitsu; Komiyama, Yoshiro; and Hashimoto, Masaoki, to Toyota Jidosha Kogyo Kabushiki Kaisha. Aluminum alloy rocker-arm. 4,147,074, Cl. 74-559.000.
Nohira, Hidetaka: *See*—
Kohama, Tokio; Obayashi, Hideki; Ozaki, Tadashi; and Nohira, Hidetaka, 4,146,986, Cl. 60-290.000.
Nojiri, Tadao; and Sugiura, Akio, to Nippondenso Co., Ltd. Method and apparatus for recognizing bar codes. 4,147,295, Cl. 235-463.000.
Nor-Am Resources Technology Incorporated: *See*—
Willums, Jan-Olaf, 4,147,454, Cl. 405-156.000.
Norisugi, Makoto, to Toa Harbor Works Co., Ltd. Improved pump-type sludge dredging apparatus. 4,146,982, Cl. 37-64.000.
Norsk Hydro a.s: *See*—
Heimdal, Ivar D.; and Skreosen, Ivar, 4,147,474, Cl. 417-54.000.
Novack, Michael W.: *See*—
Dea, Frank J.; Fairbairn, William D.; and Novack, Michael W., 4,147,769, Cl. 424-47.000.
Novak, Donald P.: *See*—
Finnicum, Loren T.; Munger, Stanley H.; and Novak, Donald P., 4,147,551, Cl. 96-94.00R.
Novak, Peter, to Rieter Machine Works, Ltd. Method and apparatus for producing a draftable twisted roving. 4,147,019, Cl. 57-66.000.
Nowogrodzki, Markus, to RCA Corporation. Surface roughness measuring apparatus. 4,148,027, Cl. 343-5.0SA.
Nuccio, Giuseppe: *See*—
Sandrone, Bruno; Nuccio, Giuseppe; and Gilardi, Emilio, 4,147,438, Cl. 400-144.200.
Nudenberg, Walter: *See*—
Mao, Chung-Ling; and Nudenberg, Walter, 4,147,678, Cl. 260-28.50R.
Numata, Kenichiro: *See*—
Sagawa, Seiji; Numata, Kenichiro; and Kondo, Hisanori, 4,147,696, Cl. 546-198.000.
Nussbaumer, Dietmar G., to Sartorius Membran-Filter GmbH. Process for manufacturing membranes for osmotic separation. 4,147,622, Cl. 210-23.00H.
Nusser, Alban: *See*—
Naeser, Helmut; and Nusser, Alban, 4,147,922, Cl. 219-216.000.
O&K Orenstein & Koppel Aktiengesellschaft: *See*—
Bangert, Hans; and Waterkamp, Peter, 4,147,375, Cl. 280-483.000.
Oakes, Ralph C., to Milliken Research Corporation. Commingling air jet deflector. 4,147,020, Cl. 57-289.000.
Obase, Hiroyuki; and Kasuya, Yutaka, to Kyowa Hakko Kogyo Co., Ltd. Process for reducing blood pressure and blocking $\beta$-adrenergic receptor. 4,147,799, Cl. 424-282.000.
Obayashi, Hideki: *See*—
Kohama, Tokio; Obayashi, Hideki; Ozaki, Tadashi; and Nohira, Hidetaka, 4,146,986, Cl. 60-290.000.
Oberhauser, Walter: *See*—
Springer, Norbert; Oberhauser, Walter; and Sommer, Joachim, 4,147,897, Cl. 179-18.0AB.
Oberlinner, Andreas: *See*—
Baumann, Hans; and Oberlinner, Andreas, 4,147,509, Cl. 8-18.00R.
Obolensky, Vsevolod: *See*—
Deliege, Jacques; Giot, Michel; Obolensky, Vsevolod; Deconinck, Luc; and Lejeune, Marc, 4,147,390, Cl. 299-8.000.
O'Brien, John J.: *See*—
Swiderski, Walter L., Jr.; O'Brien, John J.; and Kershner, Stuart D., 4,147,220, Cl. 173-170.000.
O'Brien, John L.: *See*—
Lee, D. William; O'Brien, John L.; and Rossetti, Michael, 4,147,639, Cl. 252-25.000.

O'Brien, Joseph P.: *See—*
Jayne, Gerald J. J.; Woods, David R.; and O'Brien, Joseph P., 4,147,640, Cl. 252-45.000.
Occidental Oil Shale, Inc.: *See—*
Bartel, William J.; Cha, Chang Y.; and Burton, Robert S., III, 4,147,389, Cl. 299-2.000.
French, Gordon B., 4,147,388, Cl. 299-2.000.
Occidental Petroleum Corporation: *See—*
Frischmuth, Robert W.; and Sass, Allan, 4,147,593, Cl. 201-21.000.
Ochiishi, Masanori: *See—*
Ogasawara, Toshiya; Kubo, Norimasa; Nagino, Hiroshi; Takeda, Mamoru; and Ochiishi, Masanori, 4,147,452, Cl. 405-134.000.
O'Dea, Orrin B., to Communication Mfg. Company. Relay margin test set. 4,147,901, Cl. 179-175.20R.
Oder, Robin R., to J. M. Huber Corporation. Augmenting and facilitating flushing in magnetic separation. 4,147,632, Cl. 210-222.000.
O'Donnell, Hugh T. Formed objects of coal flyash and methods of making the same. 4,147,687, Cl. 260-33.60R.
Office National d'Etudes et de Recherches Aerospatiales (O.N.E.R.A.): *See—*
Rabinovitch, Maurice; and Magnier, Pierre, 4,147,201, Cl. 164-35.000.
Ogasa, Katsuhiro, to Morinaga Milk Industry Co., Ltd. Powdery composition comprising viable Bifidobacteria cells and lactulose. 4,147,773, Cl. 424-93.000.
Ogasawara, Toshiya; Kubo, Norimasa; Nagino, Hiroshi; Takeda, Mamoru; and Ochiishi, Masanori, to Dowa Mining Co., Ltd.; and Dowa Engineering Co., Ltd. Method for constructing a rectangularly shaped tunnel. 4,147,452, Cl. 405-134.000.
Ogino, Shigeo: *See—*
Bai, Yasuo; Yanagi, Hideki; Yoshikawa, Junichi; and Ogino, Shigeo, 4,147,592, Cl. 195-66.00B.
Ogland, James W.: *See—*
Royce, Elliott F.; Royce, Jeff L.; Briskin, Alan S.; and Ogland, James W., 4,146,948, Cl. 27-2.000.
Oh, Chan S., to Beckman Instruments, Inc. Biphenyl based liquid crystal compositions. 4,147,651, Cl. 252-299.000.
Ohashi, Yasuo: *See—*
Morita, Isamu; Inoue, Hidehiko; and Ohashi, Yasuo, 4,147,371, Cl. 280-276.000.
Ohkuma, Tsuneo: *See—*
Ikari, Yoshikatsu; Yokoyama, Shoichiro; Itaya, Ryutaro; and Ohkuma, Tsuneo, 4,147,665, Cl. 252-463.000.
Ohno, Tomeji: *See—*
Shohata, Nobuaki; Ohno, Tomeji; Ikeda, Shigeru; Fukushima, Takaki; Igarashi, Ryuji; and Yoshida, Jyun-Ichiro, 4,147,670, Cl. 252-519.000.
Ohta, Michio: *See—*
Ikebe, Jun; Kumagai, Yoriaki; Takakura, Kintomo; and Ohta, Michio, 4,147,161, Cl. 128-2.00R.
Ohtake, Masaichi: *See—*
Endo, Tomizo; Sumida, Yutaka; Kawahara, Toru; Ohtake, Masaichi; Motokawa, Shoichi; Nagayama, Keiji; Shigeta, Masatomo; Hozuma, Hiroshi; Tomizawa, Masaharu; and Kikuchi, Hideo, 4,147,753, Cl. 422-202.000.
Oikawa, Satoshi, to Robertshaw Controls Company. Safety ignition means for burner installations. 4,147,496, Cl. 431-43.000.
Oka, Yoshio: *See—*
Yamawaki, Masao; Aoki, Katsuo; Oka, Yoshio; Suzuki, Takao; Amano, Masahiko; Ozaki, Hideki; and Ishihara, Osamu, 4,147,432, Cl. 118-49.100.
Okabayashi, Shigeru; Baba, Kousaku; and Endo, Hiroshi, to Nissan Motor Company, Limited. Serial-indication fault display system for vehicles. 4,148,007, Cl. 340-52.00F.
Okada, Hidehiko; Morio, Minoru; Kambara, Masahiro; and Kubota, Yukio, to Sony Corporation. Tracking control apparatus. 4,148,082, Cl. 360-77.000.
Okamura, Kiyonobu: *See—*
Setsuie, Takashi; Mimura, Koji; and Okamura, Kiyonobu, 4,147,574, Cl. 156-62.400.
Oki, Toshikazu: *See—*
Umezawa, Hamao; Takeuchi, Tomio; Hamada, Masa; Ishizuka, Masaaki; Naganawa, Hiroshi; Oki, Toshikazu; and Inui, Taiji, 4,147,778, Cl. 424-181.000.
Okuda, Hiroshi: *See—*
Tsujiuchi, Junpei; Honda, Toshio; and Okuda, Hiroshi, 4,147,052, Cl. 73-81.000.
Okuda, Yukio; and Katayama, Naohiro, to Sawafuji Electric Co. Ltd. Direct current power supply device for battery charging. 4,147,970, Cl. 320-21.000.
Okumura, Taro: *See—*
Arakawa, Masatoshi; Yamanouchi, Haruo; Okumura, Taro; and Yoshida, Teruo, 4,147,848, Cl. 526-77.000.
O'Leary, Kevin J.; Hora, Charles J.; and DeRespiris, Donald L., to Diamond Shamrock Corporation. Production of alkali metal carbonates in a cell having a carboxyl membrane. 4,147,599, Cl. 204-87.000.
O'Leary, Kevin J.: *See—*
Schenker, Barry A.; Sugano, Thomas T.; Stillman, Neil W.; and O'Leary, Kevin J., 4,147,605, Cl. 204-180.00P.
Olin Corporation: *See—*
Dever, Gerald V., Jr.; and Chiocchio, Louis R., 4,147,746, Cl. 264-39.000.
Goldstein, Stephen L.; and Gavin, David F., 4,147,846, Cl. 521-110.000.
Mendiratta, Sudhir K., 4,147,732, Cl. 260-646.000.
Richards, Thomas E.; and Kongpricha, Santad, 4,147,757, Cl. 423-313.000.
Swiderski, Walter L., Jr.; O'Brien, John J.; and Kershner, Stuart D., 4,147,220, Cl. 173-170.000.
Winter, Joseph; Shapiro, Eugene; and Smith, Warren F., 4,147,089, Cl. 90-24.00R.
Winter, Joseph; Shapiro, Eugene; and Smith, Warren F., 4,147,090, Cl. 90-24.00R.
Wojtowicz, John A.; and Klanica, Andrew J., 4,147,761, Cl. 423-473.000.
Oliver, Wayne H. Connector for wall panel structure. 4,147,001, Cl. 52-284.000.
Olsen, Richard J.; Brinkley, Max D.; and Thiele, John R., to Goodyear Tire & Rubber Company, The. Centering a tire in a mold. 4,147,482, Cl. 425-46.000.
Olson, Duane R.: *See—*
Bates, Claude F., III; and Olson, Duane R., 4,147,286, Cl. 224-48.00D.
Olszewsky, George: *See—*
Rohner, Martin J.; Olszewsky, George; and Hamilton, Harry W., 4,146,967, Cl. 33-174.00C.
Olympus Optical Company, Ltd.: *See—*
Satoh, Ken, 4,148,081, Cl. 360-67.000.
Omura, Hiroshi: *See—*
Kawakami, Sigezo; Tsuji, Kunihiko; Omura, Hiroshi; and Ishizuka, Hisai, 4,147,505, Cl. 432-118.000.
O'Neill, John F.: *See—*
Cannon, Thomas B.; and O'Neill, John F., 4,147,896, Cl. 179-15.0AS.
Ono, Yoshio: *See—*
Nishikawa, Yukio; Ono, Yoshio; and Nishida, Fumihiko, 4,147,428, Cl. 355-88.000.
Onoda, Shigeyoshi: *See—*
Goshima, Yoshitomo; Onoda, Shigeyoshi; Kawakubo, Kazuo; Hoshino, Osamu; Tsunoi, Haruo; and Iida, Noriyoshi, 4,147,501, Cl. 432-60.000.
Onosovsky, Evgeny V.: *See—*
Pronko, Vladimir G.; Onosovsky, Evgeny V.; Chuvpilo, Albert V.; Zhuravleva, Irina N.; Korneev, Viktor A.; Klimenkov, Dmitry A.; Smirnova, Galina M.; Usanov, Vladimir V.; Ivanov, Jury I.; Chernyshev, Boris A.; Nikitkin, Vasily D.; Nikolaev, Anatoly F.; Trizno, Maya S.; Karkozov, Valery G.; Verkhoglyadova, Tatyana J.; Moskalev, Evgeny V.; and Yakovleva, Lidia I., 4,147,210, Cl. 165-165.000.
Onton, Aare: *See—*
Chevallier, Jacques P.; Guarnieri, Charles R.; Onton, Aare; and Wieder, Harold, 4,147,667, Cl. 252-501.000.
Oppenlander, Harry: *See—*
Koppers, Manfred; and Oppenlander, Harry, 4,147,459, Cl. 405-303.000.
Optical Coating Laboratory, Inc.: *See—*
Apfel, Joseph H., 4,147,409, Cl. 350-164.000.
Ore-Ida Foods, Inc.: *See—*
Wassmer, Norman B.; Anderson, Franklyn G.; and Hodges, Joseph L., 4,147,619, Cl. 209-565.000.
Orlyansky, Vitaly V.: *See—*
Gokhberg, Pavel Y.; Gorbunov, Boris N.; Khardin, Alexandr P.; Rudkovsky, Vladimir L.; Belyaev, Valentin M.; Lukashov, Anatoly I.; Shpantseva, Ljudmila V.; and Orlyansky, Vitaly V., 4,147,736, Cl. 260-681.000.
Ormond, Theodore W.; and Kicinski, Kenneth J., to Nelson Industries, Inc. Combination spark arrestor and aspirating muffler. 4,147,230, Cl. 181-231.000.
O'Rourke, Thomas W.: *See—*
Milburn, William W., Jr., 4,147,300, Cl. 237-1.00A.
Ortho Pharmaceutical Corp.: *See—*
Asculai, Samuel S.; Kupferberg, Alfred B., deceased; and Halpern, coexecutor, by Meyer, 4,147,803, Cl. 424-320.000.
Ortiz, Francisco E.; and Vidales, Federico E. Internal combustion engine ignition system. 4,147,147, Cl. 123-148.0DS.
Osaka Gas Company, Ltd.: *See—*
Yamauchi, Kiaki; Morimoto, Yukihiko; Sasaki, Toshikatu; and Nakai, Katsumi, 4,147,660, Cl. 252-412.000.
Osakagodo Company Ltd.: *See—*
Yada, Akira; Iijima, Isamu; Itakura, Jo; and Fujikura, Saburo, 4,147,682, Cl. 260-29.6SQ.
Oshiro, Yasuo: *See—*
Nakagawa, Kazuyuki; and Oshiro, Yasuo, 4,147,869, Cl. 544-363.000.
Oskin, Viktor S.: *See—*
Pomogailo, Anatoly D.; Lisitskaya, Alla P.; Oskin, Viktor S.; Dyachkovsky, Fridrikh S.; Ponomarev, Ardalion N.; and Gorkova, Nina S., 4,147,664, Cl. 252-429.00B.
Ostermayer, Frederick W., Jr.: *See—*
Kerns, Becky T.; Logan, Walter; McKnight, Lee G.; Ostermayer, Frederick W., Jr.; and Terry, Milton E., 4,148,089, Cl. 361-119.000.
Osumi, Yasuaki; Suzuki, Hiroshi; Kato, Akihiko; Nakane, Masanori; and Miyake, Yoshizo, to Agency of Industrial Science & Technology; and Ministry of International Trade & Industry. Alloy for occlusion of hydrogen. 4,147,536, Cl. 75-134.00F.
Otis Elevator Company: *See—*
Henry, Thomas; and Youla, Jean, 4,147,235, Cl. 187-29.00R.
Otsuka Pharmaceutical Co., Ltd.: *See—*
Nakagawa, Kazuyuki; and Oshiro, Yasuo, 4,147,869, Cl. 544-363.000.

Outokumpu Oy: *See—*
Lilja, Launo L.; and Makitalo, Valto J., 4,147,535, Cl. 75-74.000.

Overhead Door Corporation: *See—*
Bailey, Morris W.; Luby, John J.; and Carlton, Donald G., 4,147,197, Cl. 160-7.000.

Owens-Corning Fiberglas Corporation: *See—*
Cohen, Eleanor B.; Stassen, William N.; and Wintgens, James C., 4,147,555, Cl. 106-99.000.
Lonberger, John W., 4,147,526, Cl. 65-11.00W.

Owens-Illinois, Inc.: *See—*
Dickson, Andrew C.; and Morrette, Richard A., 4,147,487, Cl. 425-174.400.
Uhlig, Albert R., 4,147,278, Cl. 222-94.000.

Oy Airam AB: *See—*
Hakkinen, Allan K., 4,147,843, Cl. 429-109.000.

Ozaki, Hideki: *See—*
Yamawaki, Masao; Aoki, Katsuo; Oka, Yoshio; Suzuki, Takao; Amano, Masahiko; Ozaki, Hideki; and Ishihara, Osamu, 4,147,432, Cl. 118-49.100.

Ozaki, Tadashi: *See—*
Kohama, Tokio; Obayashi, Hideki; Ozaki, Tadashi; and Nohira, Hidetaka, 4,146,986, Cl. 60-290.000.

Pacific Metals Co., Ltd.: *See—*
Kotaro, Ishii; Masahiko, Mitsutsuka; and Tomoyuki, Osada, 4,147,332, Cl. 266-44.000.

Pacifici, James G.; and Newland, Gordon C., to Eastman Kodak Company. Radiation curable cellulose compositions. 4,147,603, Cl. 204-159.120.

Packard Instrument Company, Inc.: *See—*
Schulz, Isidore, 4,147,250, Cl. 198-472.000.

Pako Corporation: *See—*
Diesch, Robert E.; and Strunc, Gerald R., 4,147,080, Cl. 83-371.000.
Stewart, James F., 4,147,427, Cl. 355-72.000.

Palilla, Frank C.: *See—*
McKinzie, Howard; Lester, Joseph E.; and Palilla, Frank C., 4,147,763, Cl. 423-570.000.

Palmer, Thomas Y. Wind component anemometer. 4,147,057, Cl. 73-189.000.

Paluka, Charles F.: *See—*
Moore, M. Samuel; and Paluka, Charles F., 4,147,035, Cl. 60-711.000.

Pampouchidis, Georgios, to Vianova Kunstharz, A.G. Cathodically depositable coating compositions and method of preparing. 4,147,676, Cl. 260-23.0TN.

Parcor: *See—*
Maffrand, Jean-Pierre, 4,147,787, Cl. 424-256.000.

Park, Kyu C.: *See—*
Ahearn, William E.; and Park, Kyu C., 4,147,958, Cl. 315-169.400.

Parke, Fred F.: *See—*
Kleespies, Richard M.; and Parke, Fred F., 4,147,226, Cl. 180-70.00R.

Patel, Chandrakant S.; and Patel, Rashmikant S. Pilfer-proof closure for containers. 4,147,268, Cl. 215-252.000.

Patel, Rashmikant S.: *See—*
Patel, Chandrakant S.; and Patel, Rashmikant S., 4,147,268, Cl. 215-252.000.

Patten, Hudson T.; and Woodcock, Floyd B., to Bunker Ramo Corporation. Acoustical underwater communication system for command control and data. 4,147,222, Cl. 175-9.000.

Patton, Bobbie J., to Mobil Oil Corporation. Logging-while-drilling apparatus. 4,147,223, Cl. 175-40.000.

Patton, Tad L., to Exxon Research & Engineering Co. Plasticized compositions containing polymers characterized by 1,3-imidazolidine-1,3-diyl rings and N,N-dialkyl aromatic sulfonamides. 4,147,684, Cl. 260-30.80R.

Paukh, Vyacheslav N.: *See—*
Folomin, Anatoly A.; Fesenko, Vsevolod K.; Girutsky, Olgerd I.; and Paukh, Vyacheslav N., 4,147,245, Cl. 192-85.0AA.

Paullus, Clarence L.: *See—*
Snyder, Clair W., Jr.; Paullus, Clarence L.; and Derr, Paul B., 4,147,400, Cl. 339-217.00S.

Payne, James S.: *See—*
Scribner, Jack B.; Moorman, Edward W.; and Payne, James S., 4,147,071, Cl. 74-409.000.

Payne, Robert A.: *See—*
Slobodzian, Gregory E.; Payne, Robert A.; and Fiedler, Wayne, 4,148,073, Cl. 358-240.000.

Payton, Raymond A., to Helix International Limited. Drawing instrument. 4,146,965, Cl. 33-27.00B.

Peer, John C.: *See—*
Luz, David W.; and Peer, John C., 4,147,964, Cl. 315-411.000.

Peilet, Lester R. Self-cleaning retractable comb. 4,147,174, Cl. 132-119.000.

Pejchal, Karel: *See—*
Carlsson, Erik; Pejchal, Karel; Fritzon, Hans G.; Hagstrom, Staffan; Kerff, Anton; and Wide, Lars, 4,147,187, Cl. 139-196.200.

Pellaton, Roy C. Pasta noodle packaging apparatus and method. 4,147,081, Cl. 83-407.000.

Penick, Ib; and Volkert, John K., to Compak Systems, Inc. Promotional pop-up and method of making. 4,146,983, Cl. 40-124.100.

Perkin-Elmer Corporation, The: *See—*
Boyan, Gerard E., 4,147,419, Cl. 354-66.000.

Perrig, Max, to Sandoz Ltd. Simultaneous dyeing and bonding of polyamide fibers. 4,147,508, Cl. 8-17.000.

Persson, Agne C., to Inmektor KY. Root-crowning apparatus. 4,147,099, Cl. 99-636.000.

Persson, Ake K., to SKF Industrial Trading and Development Company B.V. Corrosion resistant heat exchanger. 4,147,209, Cl. 165-161.000.

Petarra, Steve: *See—*
Southern, Raymond L.; Benford, James G.; Petarra, Steve; Holbein, Robert D.; and Vince, Albert F., 4,147,506, Cl. 432-148.000.

Peters, Joseph, Jr.; and Feeney, Brian P. Pitch change limiting device in conjunction with stringed musical instruments. 4,147,087, Cl. 84-312.00R.

Peters, Rex B.: *See—*
Bower, Gerald S.; Peters, Rex B.; and Morris, Harold D., 4,147,063, Cl. 73-504.000.

Peters, Robert N.: *See—*
Mishark, Joseph E.; Peters, Robert N.; and Pyszel, Kenneth S., 4,147,440, Cl. 400-611.000.

Petersen, Egon N.: *See—*
Blumenfeld, Georg; Petersen, Egon N.; Richtzenhain, Hermann; Vogt, Wilhelm; and Vollkommer, Norbert, 4,147,881, Cl. 560-221.000.

Petersen, Jorgen, to Kemanobel AB. Reducing the monomer content in expandable thermoplastic beads. 4,147,845, Cl. 521-56.000.

Petersen, Leif Tage: *See—*
Mundel, Erwin, 4,147,907, Cl. 200-61.030.

Peterson, James G., to TRW Inc. Sensitive high speed clocked comparator. 4,147,943, Cl. 307-355.000.

Petrolite Corporation: *See—*
Rybacki, Richard L., 4,147,647, Cl. 252-82.000.

Petrovec, David C.; and Petrovec, Philip M. Acoustical panel with rigidified edges. 4,146,999, Cl. 52-145.000.

Petrovec, Philip M.: *See—*
Petrovec, David C.; and Petrovec, Philip M., 4,146,999, Cl. 52-145.000.

Petrovich, John P.; and Taylor, David L., to Monsanto Company. Cellulosic paper containing the reaction product of a dihaloalkane alkylene diamine adduct and epihalohydrin. 4,147,586, Cl. 162-135.000.

Pettijohn, Richard R.: *See—*
Magee, Thomas J.; Pettijohn, Richard R.; Stewart, Shelley A.; and Thackray, Malcolm, 4,147,564, Cl. 148-1.500.

Pfenninger, Hans, to BBC Brown, Boveri & Company Limited. Compressed-air storage installation. 4,147,204, Cl. 165-4.000.

Pfizer Inc.: *See—*
Althuis, Thomas H.; Harbert, Charles A.; Johnson, Michael R.; and Melvin, Lawrence S., Jr., 4,147,872, Cl. 546-216.000.
Brennan, Thomas M.; Brannegan, Daniel P.; Weeks, Paul D.; and Kuhla, Donald E., 4,147,705, Cl. 260-345.90R.
Kelbaugh, Paul R.; and Sarges, Reinhard, 4,147,797, Cl. 424-273.00R.
Sarges, Reinhard, 4,147,795, Cl. 424-273.00R.

Phadke, Arun G. Distance relay for electric power transmission lines. 4,148,087, Cl. 361-80.000.

Pham Van, Doan, to Delle-Alsthom. Interconnection circuit-breaker and electric power installation employing same. 4,148,085, Cl. 361-13.000.

Philip A. Hunt Chemical Corp.: *See—*
Nelson, Warren A., 4,147,581, Cl. 156-345.000.

Phillips, D. Colin: *See—*
Garbuny, Max; and Phillips, D. Colin, 4,147,602, Cl. 204-157.10R.

Phillips Petroleum Company: *See—*
Wu, Yulin, 4,147,726, Cl. 260-586.00R.

Picquendar, Jean E.: *See—*
Alizon, Etienne; and Picquendar, Jean E., 4,148,016, Cl. 340-347.0DA.

Piedmont Wire Corporation: *See—*
Harden, David R.; and Southerland, Hugh E., 4,147,310, Cl. 242-25.00A.

Pigot, Maurice R.: *See—*
Holz, Robert G.; Lesieux, Jean-Robert; and Pigot, Maurice R., 4,147,945, Cl. 310-115.000.

Pilipenko, Vitaly A.: *See—*
Suslin, Vladimir I.; Dubovik, Alexandr I.; Makeev, Boris A.; Pilipenko, Vitaly A.; Lekarev, Zinovy A.; and Kolyshkin, Boris S., 4,147,609, Cl. 204-224.00M.

Pindar, John F.; and Cohen, Jerome M., to Lubrizol Corporation, The. Organic compositions useful as additives for fuels and lubricants. 4,147,643, Cl. 252-52.00R.

Pine Rest Christian Rehabilitation Services: *See—*
DeHart, Kenneth L.; and Wing, Raymond C., 4,147,518, Cl. 44-13.000.

Pinto, Frank. Scissors. 4,146,961, Cl. 30-341.000.

Pinto, Louis J., to General Signal Corporation. Carpet cleaning machine. 4,146,944, Cl. 15-321.000.

Pioneer Electronic Corporation: *See—*
Kurata, Junichi; Ishikawa, Kazushige; and Nagashima, Nozomu, 4,147,365, Cl. 274-9.0RA.

Pires, Antonio: *See—*
Flowers, Theodore R.; and Pires, Antonio, 4,146,960, Cl. 30-195.000.

Pirotte, Franz L. G., to U.S. Philips Corporation. Self-regulating heating element. 4,147,927, Cl. 219-541.000.

Plaia, Lawrence; and Grzybowski, Steven, to Samcoe Holding Corporation. Apparatus for steaming of tubular knitted fabric. 4,146,946, Cl. 26-18.500.

Plenk, Hans-Joachim, to Jochen Plen, KG. Ski. 4,147,377, Cl. 280-609.000.

Plessey Handel und Investments AG: *See*—
George, Peter A.; and Crystal, Harold, 4,147,224, Cl. 177-210.0FP.

Plummer, Mark A.; and Jones, Stanley C., to Marathon Oil Company. Oil recovery by increasing the injectivity index of micellar systems containing crude oil sulfonates. 4,147,637, Cl. 252-8.55D.

Plummer, Mark A., to Marathon Oil Company. Sulfonation of crude oils to produce petroleum sulfonates. 4,147,638, Cl. 252-8.55D.

Plummer, William T., to Polaroid Corporation. Back projection viewing screen. 4,147,408, Cl. 350-128.000.

Polaris N.V., Inc.: *See*—
Dimmick, Paul R., 4,147,977, Cl. 324-121.00R.

Polaroid Corporation: *See*—
Chiklis, Charles K., 4,147,668, Cl. 252-503.000.
Friedman, Harvey S.; Lippert, Irving S.; and Lothrop, John W., 4,147,425, Cl. 354-304.000.
Plummer, William T., 4,147,408, Cl. 350-128.000.
Whiteside, George D.; and Laskin, Irving, 4,147,418, Cl. 354-27.000.
Zinchuk, Michael, 4,148,071, Cl. 358-214.000.

Polychrome Corporation: *See*—
Rowe, William; and Golda, Eugene, 4,147,545, Cl. 96-49.000.

Pomogailo, Anatoly D.; Lisitskaya, Alla P.; Oskin, Viktor S.; Dyachkovsky, Fridrikh S.; Ponomarev, Ardalion N.; and Gorkova, Nina S. Catalyst of polymerization, copolymerization and oligomerization of olefins and drolefins. 4,147,664, Cl. 252-429.00B.

Ponomarev, Ardalion N.: *See*—
Pomogailo, Anatoly D.; Lisitskaya, Alla P.; Oskin, Viktor S.; Dyachkovsky, Fridrikh S.; Ponomarev, Ardalion N.; and Gorkova, Nina S., 4,147,664, Cl. 252-429.00B.

Portable Laboratories, Inc.: *See*—
Dykstra, Donald P., 4,147,100, Cl. 100-48.000.

Porter, Samuel, Jr.: *See*—
Makhlouf, Joseph M.; and Porter, Samuel, Jr., 4,147,688, Cl. 260-33.6EP.

Post Office, The: *See*—
Greaves, Alan J., 4,147,997, Cl. 333-214.000.
Hensel, Paul C., 4,147,404, Cl. 350-96.210.

Post, Roger L.: *See*—
Shoop, John C.; Post, Roger L.; and Herschler, Michael G., 4,147,475, Cl. 417-310.000.

Postell, James M., Jr., to Richtex Corporation. Apparatus for forming simulated old brick. 4,147,491, Cl. 425-385.000.

Poupelin, Jean-Pierre, to Laboratoires Creat. Anti-inflammatory and analgesic medicaments. 4,147,806, Cl. 424-343.000.

Powers, John R., to Texaco Inc. Methods for forming bubble cap assemblies for a gas and liquid contact apparatus. 4,146,950, Cl. 29-157.00R.

PPG Industries, Inc.: *See*—
Carlin, William W., 4,147,601, Cl. 204-103.000.
Donley, Harold E., 4,147,556, Cl. 106-287.180.
Eilerman, George E.; and Tamosauskas, Albert E., 4,147,833, Cl. 428-378.000.
Makhlouf, Joseph M.; and Porter, Samuel, Jr., 4,147,688, Cl. 260-33.6EP.
Scriven, Roger L.; and Chang, Wen-Hsuan, 4,147,679, Cl. 260-29.2TN.

PQ Corporation: *See*—
Kovanda, Robert J.; Maliar, Serge, Jr.; and Spencer, Robert W., 4,147,657, Cl. 252-313.00S.

Pratsch, Rudolf; and Slamecka, Ernst, to Siemens Aktiengesellschaft. Synthetic test circuit for a metal encapsulated high voltage circuit breaker. 4,147,975, Cl. 324-28.0CB.

Pray, Robert W. Drying apparatus. 4,146,974, Cl. 34-54.000.

Preiss, Michael: *See*—
Konig, Hans-Bodo; Metzger, Karl G.; Preiss, Michael; and Schrock, Wilfried, 4,147,693, Cl. 424-246.000.

Preniczny, Robert B.; and Han, Benjamin C. P., to Bendix Corporation, The. Structurally strong heat insulator for high transient temperatures. 4,147,241, Cl. 188-264.00G.

Price, John J., to Motorola, Inc. Impedance trim network for use in integrated circuit applications. 4,147,971, Cl. 323-4.000.

Procedes SEM: *See*—
Jonqueres, Pierre, 4,147,437, Cl. 366-343.000.

Procter & Gamble Company, The: *See*—
Arnau, Jose L.; Barrat, Christian R.; and Wevers, Jean, 4,147,649, Cl. 252-89.00R.
Buell, Kenneth B., 4,147,580, Cl. 156-291.000.
Gregg, Richard, 4,147,097, Cl. 99-283.000.
Liepa, Alexander L.; and Japikse, Cornelis H., 4,147,808, Cl. 426-477.000.

Production Experts, Inc.: *See*—
Gale, Allen W., 4,147,395, Cl. 312-140.200.

Pronko, Vladimir G.; Onosovsky, Evgeny V.; Chuvpilo, Albert V.; Zhuravleva, Irina N.; Korneev, Viktor A.; Klimenkov, Dmitry A.; Smirnova, Galina M.; Usanov, Vladimir V.; Ivanov, Jury I.; Chernyshev, Boris A.; Nikitkin, Vasily D.; Nikolaev, Anatoly F.; Trizno, Maya S.; Karkozov, Valery G.; Verkhoglyadova, Tatyana J.; Moskalev, Evgeny V.; and Yakovleva, Lidia I. Screen heat exchanger. 4,147,210, Cl. 165-165.000.

Proverbio, Giuseppe: *See*—
Rovera, Mario; and Proverbio, Giuseppe, 4,147,483, Cl. 425-65.000.

Putetti, Anthony M.: *See*—
Book, Walter R.; and Putetti, Anthony M., 4,147,049, Cl. 72-349.000.

Puumalainen, Pertti. Procedure for measuring unit area weights. 4,147,931, Cl. 250-273.000.

Puyplat, Olivier, to Societe Industrielle de Mecanique. Process for the application of a reflecting coating on a metallic surface. 4,147,565, Cl. 148-6.15R.

Pyszel, Kenneth S.: *See*—
Mishark, Joseph E.; Peters, Robert N.; and Pyszel, Kenneth S., 4,147,440, Cl. 400-611.000.

Quantor Corporation: *See*—
Kahle, Rolf D.; and Meadows, John W., 4,147,422, Cl. 354-299.000.

Queener, Carl A.: *See*—
Munzel, Howard E.; and Queener, Carl A., 4,147,834, Cl. 428-407.000.

Querido, Robert: *See*—
Goswami, Jagadish C.; and Querido, Robert, 4,147,853, Cl. 526-278.000.

Quesinberry, Elmen C., to Westinghouse Electric Corp. System for estimating acceleration of maneuvering targets. 4,148,029, Cl. 343-9.000.

Quintana, Leo J.: *See*—
Shaheen, Joseph M.; and Quintana, Leo J., 4,147,669, Cl. 252-512.000.

Rabilloud, Guy; and Sillion, Bernard, to Institut Francais du Petrole. Disubstituted meta-terphenyl compounds and resulting polymers. 4,147,728, Cl. 260-590.00D.

Rabinovitch, Maurice; and Magnier, Pierre, to Office National d'Etudes et de Recherches Aerospatiales (O.N.E.R.A.); and Microfusion S.A. Method of manufacturing of a metallurgical mold. 4,147,201, Cl. 164-35.000.

Rabinowitz, Mario; and Young, Frank S., to Electric Power Research Institute, Inc. High voltage overhead electrical transmission cable protected from wet environment corona losses. 4,147,890, Cl. 174-127.000.

Racal-Dana Instruments Limited: *See*—
Sizmur, Malcolm F.; Brewerton, David; and Mason, Brian W., 4,147,993, Cl. 331-1.00A.

Rader, Philip C.: *See*—
Gogineni, Madanamohana R.; Rader, Philip C.; and Rozcniak, Wilfred R., 4,147,755, Cl. 423-242.000.

Ragle, Herbert U.; and Blessum, Norman S., to Burroughs Corporation. Di-bit recording technique and associated system. 4,148,080, Cl. 360-51.000.

Raniere, Frederick D.: *See*—
Frankel, Milton B.; Raniere, Frederick D.; Thompson, Wallace W.; Witucki, Edward F.; and Woolery, Dean O., II, 4,147,731, Cl. 260-644.000.

Ranieri, Richard L.: *See*—
Calton, Gary J.; Espenshade, Marlin A.; and Ranieri, Richard L., 4,147,798, Cl. 424-279.000.

Rapko, John N., to Monsanto Company. N-Acetyl diglycolimide, and its use as a bleach activator. 4,147,654, Cl. 252-186.000.

Rappoport, William M.: *See*—
Caraher, James R.; Rappoport, William M.; DeCou, Donald F.; and Deits, William C., 4,147,950, Cl. 313-181.000.

Raptes, M. Ted: *See*—
Diethorn, Lionel J., 4,146,997, Cl. 52-81.000.

Raser, William H. Sunlight concentrator for energy conversion. 4,147,414, Cl. 350-289.000.

Rasman, Stefan; Hegedus, Pavol; and Habarda, Pavol, to Turcianske Strojarne. Combined gearbox with stepless variable speed ratio. 4,147,075, Cl. 74-720.000.

Rayfield, John F. Method and apparatus for controlling the heating and cooling function of a heat pump system. 4,147,203, Cl. 165-2.000.

Raymond, Alyce B., heir: *See*—
Bailey, Kenneth M., deceased; Raymond, Alyce B., heir; Bailey, Bruce K., heir; McElreath, Kay E. B., heir; and Wood, Marsha L. B., heir, 4,147,360, Cl. 273-261.000.

Raymond, Alyce Bailey: *See*—
Bailey, Kenneth M., deceased; Raymond, Alyce B., heir; Bailey, Bruce K., heir; McElreath, Kay E. B., heir; and Wood, Marsha L. B., heir, 4,147,360, Cl. 273-261.000.

Raynolds, Stuart, to Du Pont de Nemours, E. I., and Company. Fluorine-containing oil- and water-repellant copolymers. 4,147,851, Cl. 526-245.000.

Raytheon Company: *See*—
Derby, Ralph F., Jr., 4,146,949, Cl. 29-25.140.
Thoren, Glenn R.; Lampen, James L.; and Jerinic, George, 4,147,994, Cl. 331-56.000.

RCA Corporation: *See*—
Curtice, Walter R., 4,147,941, Cl. 307-232.000.
Foldes, Peter, 4,148,030, Cl. 343-895.000.
Foldes, Peter, 4,148,035, Cl. 343-754.000.
Harwood, Leopold A.; Groeneweg, Willem H.; and Tuma, Alois V., 4,148,058, Cl. 358-24.000.
Luz, David W.; and Peer, John C., 4,147,964, Cl. 315-411.000.
Nowogrodzki, Markus, 4,148,027, Cl. 343-5.0SA.

Reba, Imants, to Crown Zellerbach Corporation. Reel threading system. 4,147,287, Cl. 226-7.000.

Reckitt & Colman Products Limited: *See*—
Turner, Stephen, 4,147,794, Cl. 424-270.000.

Record, James G.: *See*—
Hall, William E.; and Record, James G., 4,147,274, Cl. 220-226.000.

Redmond, John P.: *See*—
Andrews, Daniel M.; Merlina, Joseph F.; Redmond, John P.; Scheingold, William S.; and Ulbrich, George, 4,147,889, Cl. 174-52.0FP.

Reed, Frederick F., to GTE Sylvania Incorporated. Jamming circuit for television signals. 4,148,064, Cl. 358-118.000.

Reeves, Charlie F., to United States of America, Navy. Fast recovery one-shot. 4,147,942, Cl. 307-273.000.

Regie Nationale des Usines Renault: *See—*
Lafont, Robert; and Hallot, Louis H., 4,147,334, Cl. 266-89.000.

Reich, Kaspar, to Herzig, Werner. Device for use with a ski binding. 4,147,378, Cl. 280-633.000.

Reichelt, Achim: *See—*
Baues, Peter; Mahlein, Hans; Moeckel, Peter; Reichelt, Achim; and Winzer, Gerhard, 4,147,979, Cl. 324-244.000.

Reichl, Helmut; and Schmidt, Ludwig, to Siemens Aktiengesellschaft. Polygonal mirror holder and drive assembly. 4,147,401, Cl. 350-6.800.

Reinke, Friedhelm; Emde, Friedhelm; Geisel, Herbert; Gies, Rolf; Muller-Axt, Friedrich; Lange, Klaus; and Schoenen, Manfred, to AEG-Elotherm, GmbH. Method of heating of at least two elongated tubular metallic objects. 4,147,569, Cl. 148-128.000.

Reischl, Artur; Jabs, Gert; and Gonzalez-Dorner, Alberto C., to Bayer Aktiengesellschaft. Production of polyurethane resins using as active hydrogen material a stable dispersion of ionic polyisocyanate-polyaddition products in hydroxyl containing compounds as a dispersing agent. 4,147,680, Cl. 260-29.2TN.

Reitberg, Johan: *See—*
Sein, Anton J.; Reitberg, Johan; and Schouten, Johan M., 4,147,737, Cl. 260-835.000.

Renaldo, Leandre. Footwear structure with interchangeable elements. 4,146,981, Cl. 36-100.000.

Renfrew, Andrew H. M.: *See—*
Bostock, Stephen B.; Renfrew, Andrew H. M.; and Cartwright, Geoffrey H., 4,147,510, Cl. 8-39.00C.

Research Corporation: *See—*
Kende, Andrew S.; Mills, John E.; and Tsay, Yuh-Geng, 4,147,706, Cl. 260-365.000.

Research Institute for Iron, Steel and other Metals of the Tohoku University, The: *See—*
Yajima, Seishi; Kayano, Hideo; Asada, Chiaki; and Saito, Makoto, 4,147,538, Cl. 75-229.000.

Reuland, Joachim, to Hauni Werke Koerber & Co. KG. Apparatus for monitoring rod-shaped commodities in cigarette making machines or the like. 4,147,173, Cl. 131-21.00B.

Rexnord Inc.: *See—*
Smith, Larry C.; and Nienhaus, Alan M., 4,147,367, Cl. 277-152.000.

Rheon Automatic Machinery Co., Ltd.: *See—*
Tashiro, Yasunori; Yashiro, Takahiro; and Higuchi, Katsuaki, 4,147,014, Cl. 53-559.000.

Rhodes, William E., III: *See—*
Singer, Arnold J.; Lover, Myron J.; Rhodes, William E., III; Bilodeau, William N.; and Lynch, Donald M., 4,147,800, Cl. 424-312.000.

Rhodes, William H., to GTE Laboratories Incorporated. Transparent yttria ceramics and method for producing same. 4,147,744, Cl. 264-1.000.

Rhone-Poulenc Industries: *See—*
Bargain, Michel; and Lefort, Marcel, 4,147,711, Cl. 260-448.20N.

Rich, Russell P., to Burns & Russell Company of Baltimore, The. Smoke and fire resistant compositions. 4,147,690, Cl. 260-45.70R.

Richards, Thomas E.; and Kongpricha, Santad, to Olin Corporation. Method for producing ammonium phosphate which is substantially free of arsenic. 4,147,757, Cl. 423-313.000.

Richardson, Carl; and Wiley, Philip A., to Bedford Engineering Corporation. Method and apparatus for measuring product contents. 4,147,618, Cl. 209-589.000.

Richter, Friedrich, to Hermann Windel GmbH & Co. Spreader roll. 4,146,947, Cl. 26-104.000.

Richtex Corporation: *See—*
Postell, James M., Jr., 4,147,491, Cl. 425-385.000.

Richtzenhain, Hermann: *See—*
Blumenfeld, Georg; Petersen, Egon N.; Richtzenhain, Hermann; Vogt, Wilhelm; and Vollkommer, Norbert, 4,147,881, Cl. 560-221.000.

Ricoh Company, Ltd.: *See—*
Kawamura, Atsushi; and Kawazu, Motoaki, 4,147,412, Cl. 350-252.000.
Namiki, Ryoichi, 4,147,832, Cl. 428-375.000.
Shiina, Toshio, 4,147,339, Cl. 271-7.000.

Riddle, Herbert S., Jr. Noise reduction apparatus. 4,148,078, Cl. 360-27.000.

Riegert, Hermann: *See—*
Ritter, Rolf; and Riegert, Hermann, 4,147,918, Cl. 219-121.0EM.

Ries, Karl: *See—*
Lather, Dieter; Janssen, Klaus-Uwe; Ries, Karl; Moller, Peter; and Forstermann, Ulrich, 4,147,065, Cl. 73-611.000.

Rieter Machine Works, Ltd.: *See—*
Novak, Peter, 4,147,019, Cl. 57-66.000.

Riggs, Aubrey F., to Imperial Chemical Industries Limited. Coating apparatus. 4,147,126, Cl. 118-227.000.

Riken Keikinzoku Kogyo Kabushiki Kaisha: *See—*
Shigeta, Fumio; and Kaneda, Kazuyoshi, 4,147,598, Cl. 204-35.00N.

Riker Laboratories, Inc.: *See—*
Erickson, Edward H., 4,147,694, Cl. 546-169.000.

Ringdal, Lars, to KUPAG Kunststoff-Patent-Verwaltungs AG. Ammunition cartridge. 4,147,107, Cl. 102-43.00P.

Ripper, Wolfgang: *See—*
Wessel, Wolf; and Ripper, Wolfgang, 4,147,146, Cl. 123-139.0AW.

Ritter, Charles H.: *See—*
Rubel, Ira A.; Steiner, Herbert A.; and Ritter, Charles H., 4,147,050, Cl. 73-1.00H.

Ritter, Rolf; and Riegert, Hermann, to Wurttembergische Metallwarenfabrik. Method of making knives. 4,147,918, Cl. 219-121.0EM.

Robert Bosch GmbH: *See—*
Horstmann, Winfried, 4,148,079, Cl. 360-36.000.
Kamin, Gerhard, 4,148,062, Cl. 358-105.000.
Wessel, Wolf; and Ripper, Wolfgang, 4,147,146, Cl. 123-139.0AW.

Roberts, Frank W.: *See—*
Jenkins, Barry R.; Roberts, Waldo C.; and Roberts, Frank W., 4,146,933, Cl. 2-2.000.

Roberts, Waldo C.: *See—*
Jenkins, Barry R.; Roberts, Waldo C.; and Roberts, Frank W., 4,146,933, Cl. 2-2.000.

Robertshaw Controls Company: *See—*
Oikawa, Satoshi, 4,147,496, Cl. 431-43.000.
Steele, Everett T., Jr., 4,147,180, Cl. 137-599.200.

Robinson, John W.; and Howell, Stephen L., to Kimball International, Inc. Electronic organ having memory circuit. 4,147,085, Cl. 84-1.170.

Robinson, William R. Adjustable deburring tool. 4,147,463, Cl. 408-156.000.

Rocholl, Henning: *See—*
Klein, Willi; and Rocholl, Henning, 4,147,240, Cl. 188-218.0XL.

Rockwell International Corporation: *See—*
Frankel, Milton B.; Raniere, Frederick D.; Thompson, Wallace W.; Witucki, Edward F.; and Woolery, Dean O., II, 4,147,731, Cl. 260-644.000.
Shaheen, Joseph M.; and Quintana, Leo J., 4,147,669, Cl. 252-512.000.

Roczniak, Wilfred R.: *See—*
Gogineni, Madanamohana R.; Rader, Philip C.; and Roczniak, Wilfred R., 4,147,755, Cl. 423-242.000.

Rodgers, Barry, to Rolls-Royce Limited. Jet engine thrust reverser and cowl structure. 4,147,028, Cl. 60-226.00A.

Rodriguez, Victor N. Weed plucker. 4,147,329, Cl. 254-132.000.

Roessler, Bernward, to Siemens Aktiengesellschaft. N-channel memory field effect transistor. 4,148,044, Cl. 357-23.000.

Rogers, Noel A. Low level modulation system for a radio transmitter. 4,147,985, Cl. 325-144.000.

Rogers, Pamela J.: *See—*
Hutton, Thomas W.; and Rogers, Pamela J., 4,147,850, Cl. 526-207.000.

Rogers, Richard A.: *See—*
Hodge, Lee R.; Crowell, John M.; and Rogers, Richard A., 4,147,215, Cl. 116-315.000.

Rohm GmbH: *See—*
Gaenzler, Wolfgang; Kabs, Klaus; and Schroeder, Guenter, 4,147,718, Cl. 260-465.900.

Rohm and Haas Company: *See—*
Hurt, William S., 4,147,781, Cl. 424-211.000.
Hutton, Thomas W.; and Rogers, Pamela J., 4,147,850, Cl. 526-207.000.
Machleder, Warren H.; and Bollinger, Joseph M., 4,147,641, Cl. 252-51.50A.
McNulty, Patrick J.; and Warner, Harlow L., 4,147,528, Cl. 71-92.000.

Rohner, Martin J.; Olszewsky, George; and Hamilton, Harry W., to Boeing Company, The. Rotor blade inspection fixture. 4,146,967, Cl. 33-174.00C.

Rohr Industries, Incorporated: *See—*
Koss, Muriel L., 4,147,578, Cl. 156-245.000.

Rolls-Royce Limited: *See—*
Rodgers, Barry, 4,147,028, Cl. 60-226.00A.

Roman, Walter G.; and Sutton, Harry G., Jr., to Westinghouse Electric Corp. Control rod for a nuclear reactor. 4,147,589, Cl. 176-36.00C.

Romanov, Anastasia T., administrator: *See—*
Gorodissky, Leonid G.; Evtikhovich, Stanislav M.; Grigoriev, Igor P.; Kvashnin, Nikolai A.; Sokolov, Vladislav I.; Chekreneva, Larisa S.; Birdus, Rostislav G.; Zaitseva, Maria A.; Kryazhev, Jury T.; Kuzminova, Galina V.; and Romanov, Nikolai T., deceased, 4,147,366, Cl. 277-22.000.

Romanov, Nikolai T., deceased: *See—*
Gorodissky, Leonid G.; Evtikhovich, Stanislav M.; Grigoriev, Igor P.; Kvashnin, Nikolai A.; Sokolov, Vladislav I.; Chekreneva, Larisa S.; Birdus, Rostislav G.; Zaitseva, Maria A.; Kryazhev, Jury T.; Kuzminova, Galina V.; and Romanov, Nikolai T., deceased, 4,147,366, Cl. 277-22.000.

Romime, Donald J.: *See—*
Bienkowski, Joseph V.; Romime, Donald J.; and Davis, Donald C., 4,147,513, Cl. 23-232.00E.

Ronel, Samuel H.: *See—*
Levy, Didya D.; and Ronel, Samuel H., 4,147,764, Cl. 424-1.000.

Rood, William H.: *See—*
Lusk, Joe F.; and Rood, William H., 4,148,008, Cl. 340-58.000.

Rook, Charles W.: *See—*
United States of America, National Aeronautics and Space Administration; and Rook, Charles W., 4,147,980, Cl. 325-24.000.

Roos, Ernst, to Bayer Aktiengesellschaft. Mono-, bis- and tris-sulphenyl chlorides. 4,147,722, Cl. 260-543.00H.

Roos, Sture G., to Telefonaktiebolaget L M Ericsson. Arrangement for distribution of clock signals. 4,147,891, Cl. 178-69.100.

Roper Corporation: *See—*
Milton, Clare L., Jr., 4,147,502, Cl. 432-72.000.
Uyeda, Frederick K., 4,147,912, Cl. 219-10.55F.

Rosenstock, Gunter, to Siemens Aktiengesellschaft. Method and appa-

ratus for purging air from jet ink writing systems. 4,148,041, Cl. 346-140.00R.

Rosero, Jaime P. Rotatable ejection container game with random distribution. 4,147,352, Cl. 273-93.00R.

Ross, William A.: *See*—
Corbo, Kenneth P.; Shepard, Richard W.; Ross, William A.; and Ashmead, Albert S., 4,147,570, Cl. 148-144.000.

Rossetti, Michael: *See*—
Lee, D. William; O'Brien, John L.; and Rossetti, Michael, 4,147,639, Cl. 252-25.000.

Roth, Steven R.: *See*—
Woron, Robert P.; Whitefield, J. Thomas; and Roth, Steven R., 4,147,083, Cl. 84-1.010.

Rougeot, Henri; and Roziere, Guy, to Thomson-CSF. Solid-state device for detecting and locating the points of impact of ionizing radiation. 4,147,933, Cl. 250-370.000.

Roussel Uclaf: *See*—
Allais, Andre; Clemence, Francois; and Deraedt, Roger, 4,147,790, Cl. 424-250.000.
Teutsch, Jean G., 4,147,695, Cl. 260-239.55C.

Rovera, Mario; and Proverbio, Giuseppe, to Technical Services Company-Tesco S.p.A. Climbing shuttering for casting concrete structures such as dams or retaining walls. 4,147,483, Cl. 425-65.000.

Rowe, William; and Golda, Eugene, to Polychrome Corporation. Photolithographic developing composition with organic lithium compound. 4,147,545, Cl. 96-49.000.

Royce, Elliott F.; Royce, Jeff L.; Briskin, Alan S.; and Ogland, James W., to Royce, Elliott F. Casket. 4,146,948, Cl. 27-2.000.

Royce, Jeff L.: *See*—
Royce, Elliott F.; Royce, Jeff L.; Briskin, Alan S.; and Ogland, James W., 4,146,948, Cl. 27-2.000.

Roziere, Guy: *See*—
Rougeot, Henri; and Roziere, Guy, 4,147,933, Cl. 250-370.000.

Rubel, Ira A.; Steiner, Herbert A.; and Ritter, Charles H., to Gull Airborne Instruments, Inc. Apparatus for testing a capacitance responsive gaging system. 4,147,050, Cl. 73-1.00H.

Rudkovsky, Vladimir L.: *See*—
Gokhberg, Pavel Y.; Gorbunov, Boris N.; Khardin, Alexandr P.; Rudkovsky, Vladimir L.; Belyaev, Valentin M.; Lukashov, Anatoly I.; Shpantseva, Ljudmila V.; and Orlyansky, Vitaly V., 4,147,736, Cl. 260-681.000.

Ruetz, Georg: *See*—
Leicht, Werner; and Ruetz, Georg, 4,147,467, Cl. 415-196.000.

Ruiz, Juan R. C.: *See*—
Garcia, Antonio A.; Ruiz, Juan R. C.; and Lozano, Juan B., 4,147,870, Cl. 544-383.000.

Ruplen, Norman P. Animal platform. 4,147,129, Cl. 119-1.000.

Russell, Jack A. Electronic control system. 4,147,939, Cl. 307-116.000.

Russell, Thomas J., to Krytar. Beam lead rod assembly. 4,147,998, Cl. 333-238.000.

Rutherford, John; and Eggers, Charles F., to Hooker Chemicals & Plastics Corp. Electrolytic method of producing concentrated hydroxide solutions. 4,147,600, Cl. 204-98.000.

Rutledge, Thomas F., to ICI Americas Inc. Oxidative coupling of alkylphenols, alkoxyphenols and naphthols catalyzed by metal complexes of amino carboxylic and amino sulfonic acids. 4,147,663, Cl. 252-428.000.

Rybacki, Richard L., to Petrolite Corporation. Scale converters. 4,147,647, Cl. 252-82.000.

Rydell, Robert A.: *See*—
Steffensen, Leslie M.; Dutell, H. Gary; and Rydell, Robert A., 4,146,973, Cl. 34-41.000.

Ryobi Ltd.: *See*—
Sazaki, Kounin, 4,147,313, Cl. 242-84.20G.

S & S Medical Products Co., Inc.: *See*—
Skobel, Barry A., 4,147,443, Cl. 403-267.000.

Sabatelli, Philip M.; and Daugherty, Denny E., to Chemed Corporation. Slurried detergent and method. 4,147,650, Cl. 252-103.000.

Sable, Claude: *See*—
Chardonneau, Joel; and Sable, Claude, 4,147,477, Cl. 417-343.000.

Sabourin, Edward T.; and Barie, Walter P., Jr., to Gulf Research & Development Company. Epoxy resin compositions (Case A) containing cumene-maleic anhydride residue. 4,147,856, Cl. 528-92.000.

Sabourin, Edward T.: *See*—
Schulz, Johann G. D.; and Sabourin, Edward T., 4,147,882, Cl. 562-410.000.

Saburi, Akio: *See*—
Watanabe, Yoshio; and Saburi, Akio, 4,147,894, Cl. 179-15.00A.

Sagawa, Seiji; Numata, Kenichiro; and Kondo, Hisanori, to Sumitomo Chemical Company, Limited. 1-(2-Benzothiazolylthio)-piperidines. 4,147,696, Cl. 546-198.000.

Sain, Jerry T.: *See*—
Baump, Paul A.; Lyu, Don; Sain, Jerry T.; and Zbriger, Richard A., 4,148,012, Cl. 340-149.00A.

Saint-Gobain Industries: *See*—
Chiron, Georges, 4,147,488, Cl. 425-174.80E.

Saito, Makoto, to Tomy Kogyo Co., Inc. Crash van chase. 4,147,351, Cl. 273-86.00B.

Saito, Makoto: *See*—
Yajima, Seishi; Kayano, Hideo; Asada, Chiaki; and Saito, Makoto, 4,147,538, Cl. 75-229.000.

Saito, Tsutomu: *See*—
Ito, Masami; Saito, Tsutomu; and Morita, Yoshiyuki, 4,147,148, Cl. 123-179.00L.

Sakai, Takeo: *See*—
Sato, Akira; Ikeda, Tadashi; Sakai, Takeo; Takei, Haruo; and Hayashi, Jun, 4,147,553, Cl. 96-122.000.

Sakaida, Kaku, to Trio Kabushiki Kaisha. AM-FM receiver. 4,147,986, Cl. 325-316.000.

Sakakibara, Shumpei: *See*—
Nagatsu, Toshiharu; and Sakakibara, Shumpei, 4,147,692, Cl. 260-112.50R.

Sakamoto, Eiichi: *See*—
Habu, Teiji; Nakajima, Tomio; Sakamoto, Eiichi; Fujimori, Noboru; and Mine, Kiyomitsu, 4,147,542, Cl. 96-27.00E.

Samcoe Holding Corporation: *See*—
Plaia, Lawrence; and Grzybowski, Steven, 4,146,946, Cl. 26-18.500.

Sanders Associates, Inc.: *See*—
Simpson, Paul K., 4,147,369, Cl. 280-30.000.

Sanders, James M.: *See*—
Sprecker, Mark A.; Vock, Manfred H.; Schmitt, Frederick L.; Hall, John B.; and Sanders, James M., 4,147,727, Cl. 260-586.00R.

Sandiford, Burton B., to Union Oil Company of California. Enhanced oil recovery process utilizing a plurality of wells. 4,147,211, Cl. 166-270.000.

Sandoz Ltd.: *See*—
Drake, William O.; Finck, Hans-Werner; Mayerhoefer, Horst; and Mueller, Woflgang H., 4,147,636, Cl. 252-8.100.
Perrig, Max, 4,147,508, Cl. 8-17.000.
Stutz, Peter; and Stadler, Paul, 4,147,789, Cl. 424-261.000.

Sandrone, Bruno; Nuccio, Giuseppe; and Gilardi, Emilio, to Ing C. Olivetti C., S.p.A. Serial printer for typewriters, teleprinters and data processors. 4,147,438, Cl. 400-144.200.

Sankyo Company Limited: *See*—
Miyadera, Tetsuo; Nagano, Mitsuo; and Sugawara, Shinichi, 4,147,863, Cl. 542-436.000.

Sano, Hiroshi, to Tomy Kogyo Co., Inc. Toy trackway. 4,146,991, Cl. 46-202.000.

Sano, Takezo; Shimomura, Takatoshi; Sasaki, Masao; and Murase, Ichiki, to Sumitomo Chemical Company Limited. Process for producing semipermeable membranes. 4,147,745, Cl. 264-22.000.

Sanyo Electric Co., Ltd.: *See*—
Imamura, Eigo, 4,147,987, Cl. 325-455.000.

Sarantsev, Kir B.: *See*—
Bufalov, Gimn V.; Sarantsev, Kir B.; Bogoradovsky, Gennady I.; Titensky, Vladimir I.; Stolyarov, Alexei V.; Bavelsky, David M.; and Burdin, Alexandr A., 4,147,473, Cl. 417-53.000.

Sarges, Reinhard, to Pfizer Inc. Hydantoin derivatives as therapeutic agents. 4,147,795, Cl. 424-273.00R.

Sarges, Reinhard: *See*—
Kelbaugh, Paul R.; and Sarges, Reinhard, 4,147,797, Cl. 424-273.00R.

Sargisson, Donald F., to General Electric Company. Long duct mixed flow gas turbine engine. 4,147,029, Cl. 60-262.000.

Sartorius Membran-Filter GmbH: *See*—
Nussbaumer, Dietmar G., 4,147,622, Cl. 210-23.00H.

Sasaki, Masao: *See*—
Sano, Takezo; Shimomura, Takatoshi; Sasaki, Masao; and Murase, Ichiki, 4,147,745, Cl. 264-22.000.

Sasaki, Toshikatu: *See*—
Yamauchi, Kiaki; Morimoto, Yukihiko; Sasaki, Toshikatu; and Nakai, Katsumi, 4,147,660, Cl. 252-412.000.

Sass, Allan: *See*—
Frischmuth, Robert W.; and Sass, Allan, 4,147,593, Cl. 201-21.000.

Satellite Transmission Systems, Inc.: *See*—
Hershberg, David E., 4,148,060, Cl. 358-83.000.

Sato, Akira; Ikeda, Tadashi; Sakai, Takeo; Takei, Haruo; and Hayashi, Jun, to Fuji Photo Film Co., Ltd. Supersensitized photographic emulsion. 4,147,553, Cl. 96-122.000.

Sato, Seiki. Electric heating element for electric resistance furnaces. 4,147,888, Cl. 13-22.000.

Sato, Takahisa: *See*—
Shimizu, Noboru; Yanagisawa, Isao; Takata, Masahiro; and Sato, Takahisa, 4,147,885, Cl. 562-535.000.

Satoh, Ken, to Olympus Optical Company, Ltd. Volume controlled tape end alarm for tape recorder. 4,148,081, Cl. 360-67.000.

Satomura, Masato: *See*—
Kubotera, Kikuo; Mizuki, Eiichi; Satomura, Masato; Iwano, Haruhiko; and Fujiwara, Tadahiro, 4,147,543, Cl. 96-29.00R.

Saumsiegle, Robert W. Displacement blow-molding. 4,147,748, Cl. 264-523.000.

Saunders, Thomas K.: *See*—
Costello, Matthew J.; Saunders, Thomas K.; and DeLuca, Albert M., 4,148,076, Cl. 358-286.000.

Savoit, Robert E.; and Henry, Clemence J., to Texaco Inc. Composition for retarding the evaporation of water. 4,147,658, Cl. 252-384.000.

Sawafuji Electric Co. Ltd.: *See*—
Okuda, Yukio; and Katayama, Naohiro, 4,147,970, Cl. 320-21.000.

Sawyer, Edgar W., Jr., to International Telephone & Telegraph Corp. Coal suspensions in organic liquids. 4,147,519, Cl. 44-51.000.

Saylor, Richard, to IDR, Inc. Interface for enabling continuous high speed row grabbing video display with real time hard copy print out thereof. 4,148,066, Cl. 358-127.000.

Sayre, S. Rex. Rack for photographic film. 4,147,423, Cl. 354-344.000.

Sazaki, Kounin, to Ryobi Ltd. Bail latching and releasing mechanism for spin fishing reel. 4,147,313, Cl. 242-84.20G.

Schade, Reinhart, to Siemens Aktiengesellschaft. Method of producing an electric component consisting of elements joined by an insulating co-polymer layer. 4,147,579, Cl. 156-252.000.

Schaefer Marine Products: *See*—
Merry, Carl A., 4,147,122, Cl. 114-218.000.
Schaeflern, Henry, to Singer Company, The. Carriage drive for a flat bed knitting machine. 4,147,043, Cl. 66-60.00R.
Schaper, Jurgen: *See*—
Friedrich, Helmut; and Schaper, Jurgen, 4,147,025, Cl. 60-39.060.
Schaper, Raymond J.: *See*—
Lim, Sim Koei; Bloomquist, Arnold E.; and Schaper, Raymond J., 4,147,681, Cl. 260-29.6TA.
Scheingold, William S.: *See*—
Andrews, Daniel M.; Merlina, Joseph F.; Redmond, John P.; Scheingold, William S.; and Ulbrich, George, 4,147,889, Cl. 174-52.0FP.
Schelkmann, Wilhelm, to Vakuum Vulk Holding Limited. Method and apparatus for the renewal of the tread of a worn pneumatic or solid rubber tire. 4,147,642, Cl. 156-96.000.
Schenker, Barry A.; Sugano, Thomas T.; Stillman, Neil W.; and O'-Leary, Kevin J., to Diamond Shamrock Corporation. Method of producing sols by electrodialysis. 4,147,605, Cl. 204-180.00P.
Scherbing, Frank J., to Chicago Lock Co. Sleeve and terminal holder assembly for an axial split-pin tumbler-type switch lock mechanism. 4,147,905, Cl. 200-44.000.
Schiefer, Erwin: *See*—
Herb, Armin; and Schiefer, Erwin, 4,147,444, Cl. 403-313.000.
Schiele, Otto; and Florjancic, Dusan, to Klein, Schanzlin & Becker Aktiengesellschaft. Means for abruptly terminating the flow of fluid in closed fluid circuit systems of nuclear reactor plants or the like. 4,147,465, Cl. 415-143.000.
Schiller, August; Dorsch, Norman; and Sommer, Owsin, to Wacker-Chemie GmbH. Organopolysiloxane compositions and elastomers obtained therefrom. 4,147,855, Cl. 528-23.000.
Schlageter, Klaus: *See*—
Andrich, Ekkehard; and Schlageter, Klaus, 4,147,815, Cl. 427-64.000.
Schliebs, Reinhard: *See*—
La Spina, Andrea; Dietrich, Werner; and Schliebs, Reinhard, 4,147,710, Cl. 260-429.900.
Schluter, James C. Pipe coupling. 4,147,383, Cl. 285-373.000.
Schmelzer, Hans G.: *See*—
Hetzel, Hartmut; Konig, Klaus; Schmelzer, Hans G.; and Wagner, Kuno, 4,147,714, Cl. 260-453.0AB.
Schmidt, Ludwig: *See*—
Reichl, Helmut; and Schmidt, Ludwig, 4,147,401, Cl. 350-6.800.
Schmidt, Sheldon P.: *See*—
Molnar, John A.; Stewart, James B.; and Schmidt, Sheldon P., 4,147,133, Cl. 119-55.000.
Schmitt, Frederick L.: *See*—
Sprecker, Mark A.; Vock, Manfred H.; Schmitt, Frederick L.; Hall, John B.; and Sanders, James M., 4,147,727, Cl. 260-586.00R.
Schmohe, James S.: *See*—
Linscott, Phillip S., Jr.; and Schmohe, James S., 4,147,946, Cl. 310-214.000.
Schneider, Richard: *See*—
Herchenbach, Horst; and Schneider, Richard, 4,147,503, Cl. 432-78.000.
Schnepfe, Robert W., Jr.; and Lowe, Laban R., Sr., to AAI Corporation. Penetrator/nozzle arrangement. 4,147,216, Cl. 169-70.000.
Schoenen, Manfred: *See*—
Reinke, Friedhelm; Emde, Friedhelm; Geisel, Herbert; Gies, Rolf; Muller-Axt, Friedrich; Lange, Klaus; and Schoenen, Manfred, 4,147,569, Cl. 148-128.000.
Scholl, Inc.: *See*—
Sichak, Stephen, 4,147,770, Cl. 424-45.000.
Schoonmaker, Townsend L. Fixed dredge cleanout means. 4,147,450, Cl. 405-74.000.
Schouten, Johan M.: *See*—
Sein, Anton J.; Reitberg, Johan; and Schouten, Johan M., 4,147,737, Cl. 260-835.000.
Schreck, Raymond M.: *See*—
Gelbard, Robert B.; and Schreck, Raymond M., 4,147,037, Cl. 62-113.000.
Schreinemakers, Josephus. Dental impression tray. 4,146,963, Cl. 32-17.000.
Schreurs, Willy P., to GTE Sylvania Incorporated. Method of improving the output and maintenance of a fluorescent lamp. 4,147,816, Cl. 427-67.000.
Schrock, Wilfried: *See*—
Konig, Hans-Bodo; Metzger, Karl G.; Preiss, Michael; and Schrock, Wilfried, 4,147,693, Cl. 424-246.000.
Schroeder, Guenter: *See*—
Gaenzler, Wolfgang; Kabs, Klaus; and Schroeder, Guenter, 4,147,718, Cl. 260-465.900.
Schuierer, Erich: *See*—
Bathelt, Heinrich; Billenstein, Siegfried; and Schuierer, Erich, 4,147,743, Cl. 260-924.000.
Schulte-Elte, Karl-Heinrich; Willhalm, Bruno; and Gautschi, Fritz, to Firmenich SA. Cyclic $C_6$ ketones in perfumes. 4,147,672, Cl. 252-522.000.
Schulz, Isidore, to Packard Instrument Company, Inc. Storage and indexing mechanism for multiple sample containers. 4,147,250, Cl. 198-472.000.
Schulz, Johann G. D.; and Sabourin, Edward T., to Gulf Research & Development Company. Organic acids and process for preparing same. 4,147,882, Cl. 562-410.000.
Schulze, Heinz: *See*—
Waddill, Harold G.; and Schulze, Heinz, 4,147,857, Cl. 528-94.000.
Schwartz, Robert. Film holder. 4,147,662, Cl. 250-444.000.
Schwartz, Stephen H.; and Buchwald, Alexander. Antiseptic composition. 4,147,775, Cl. 424-150.000.
Schwarz, Walter. Pipe coupling. 4,147,381, Cl. 285-53.000.
Schweiger, Carl W., to Dow Corning Corporation. Method of preparing flexible flame retardant polyether based one-shot polyurethane foams and compositions therefore. 4,147,847, Cl. 521-112.000.
Scott, Geoffrey: *See*—
Newton, Eric W.; and Scott, Geoffrey, 4,147,103, Cl. 101-115.000.
Scribner, Jack B.; Moorman, Edward W.; and Payne, James S., to TRW Inc. Low backlash gear reduction assembly. 4,147,071, Cl. 74-409.000.
Scriven, Roger L.; and Chang, Wen-Hsuan, to PPG Industries, Inc. Water-reduced urethane coating compositions. 4,147,679, Cl. 260-29.2TN.
Sealectro Corporation: *See*—
Iantorno, James, 4,147,397, Cl. 339-17.00C.
Secor, Arthur D.; and Secor, Jerome G., to Great Lakes Industries, Inc. Gas-liquid hydraulic expandable chucks and shafts. 4,147,312, Cl. 242-72.00R.
Secor, Jerome G.: *See*—
Secor, Arthur D.; and Secor, Jerome G., 4,147,312, Cl. 242-72.00R.
Segawa, Takashi; and Fukui, Seiji, to Shimano Industrial Company Limited. Multi-speed transmission hub for a bicycle. 4,147,243, Cl. 192-6.00A.
Segawa, Takashi; and Fukui, Seiji, to Shimano Industrial Company Limited. Multi-speed transmission hub. 4,147,244, Cl. 192-6.00A.
Seiersen, Ole S., to Christian Rovsing A/S. Apparatus for detecting echo signals. 4,148,025, Cl. 343-5.0VQ.
Sein, Anton J.; Reitberg, Johan; and Schouten, Johan M., to Internationale Octrooi Maatschappij Octropa B.V. Powder coating composition employing mixture of polyepoxide resin with modified polyester resin. 4,147,737, Cl. 260-835.000.
Sekisui Kagaku Kogyo Kabushiki Kaisha: *See*—
Hukumoto, Yorio; Kashiwadani, Hiroshi; and Hiramatsu, Shuji, 4,147,819, Cl. 427-195.000.
Sekiya, Fukuo; Ebihara, Heihachiro; and Nishimura, Katsuo, to Citizen Watch Co., Ltd. Electronic timepiece with an electrochromic display. 4,148,015, Cl. 340-763.000.
Semco Instruments, Inc.: *See*—
Moore, M. Samuel; and Paluka, Charles F., 4,147,035, Cl. 60-711.000.
Seragnoli, Enzo, to G.D. Societa per Azioni. Device for transferring soft cake-shaped products from a first to a second conveyor. 4,147,013, Cl. 53-494.000.
Setsuie, Takashi; Mimura, Koji; and Okamura, Kiyonobu, to Mitsubishi Rayon Company, Limited. Suede-like sheet materials and method of producing the same. 4,147,574, Cl. 156-62.400.
Seymour, David J.: *See*—
Kirby, William E.; and Seymour, David J., 4,147,123, Cl. 114-260.000.
Shaffer, Richard D.; and Windheuser, John J., to Interx Research Corporation. Enteric coated digoxin and therapeutic use thereof. 4,147,768, Cl. 424-35.000.
Shah, Ramesh B.: *See*—
Gryczka, Alfred J.; and Shah, Ramesh B., 4,147,807, Cl. 426-56.000.
Shaheen, Joseph M.; and Quintana, Leo J., to Rockwell International Corporation. Conductive adhesive for providing electrical and thermal conductivity. 4,147,669, Cl. 252-512.000.
Shakas, Pauline V. Combination bathtub and bassinet structure. 4,146,938, Cl. 4-177.00R.
Shaleesh, George: *See*—
Geria, Navin; and Shaleesh, George, 4,147,750, Cl. 264-255.000.
Shapiro, Eugene: *See*—
Winter, Joseph; Shapiro, Eugene; and Smith, Warren F., 4,147,089, Cl. 90-24.00R.
Winter, Joseph; Shapiro, Eugene; and Smith, Warren F., 4,147,090, Cl. 90-24.00R.
Sharon Electronics Limited: *See*—
Griffiths, John S.; and Stone, Roger N., 4,147,051, Cl. 73-32.00R.
Sharp, James H.: *See*—
Lindblad, Nero R.; Johnson, Gordon E.; and Sharp, James H., 4,147,541, Cl. 96-1.500.
Shaw, Arthur G.: *See*—
Garbelman, David L.; Minor, William H.; and Shaw, Arthur G., 4,147,436, Cl. 365-25.000.
Shell Oil Company: *See*—
Hall, William E.; and Record, James G., 4,147,274, Cl. 220-226.000.
Sheng, Ming N.; and Kao, Jar-Lin, to Atlantic Richfield Company. Liquid phase oxidation of unsaturated aldehydes to corresponding acids. 4,147,884, Cl. 562-533.000.
Shepard, Richard W.: *See*—
Corbo, Kenneth P.; Shepard, Richard W.; Ross, William A.; and Ashmead, Albert S., 4,147,570, Cl. 148-144.000.
Shephard, Margaret C.; and Worthington, Paul A., to Imperial Chemical Industries Limited. Fungicidal azolyl-substituted aryl aralkylketone compounds. 4,147,793, Cl. 424-269.000.
Sherberne, Charles W. Replaceable paddle blade. 4,147,469, Cl. 416-70.00R.
Sherwin-Williams Co., The: *See*—
Tisdale, Vernon R., 4,147,212, Cl. 166-244.00C.
Shiau, Chin-Chih, to NCR Canada Ltd. - NCR Canada Ltee. Magnetic ink character reader system. 4,148,010, Cl. 340-146.30C.
Shibata, Kiyoshi: *See*—
Miyoshi, Hideo; Shibata, Kiyoshi; Fukuoka, Shogo; and Aizawa, Tatsuo, 4,147,426, Cl. 355-3.0SH.

Shigeta, Fumio; and Kaneda, Kazuyoshi, to Riken Keikinzoku Kogyo Kabushiki Kaisha. Method for producing colored anodic oxide films on aluminum based alloy materials. 4,147,598, Cl. 204-35.00N.

Shigeta, Masatomo: *See—*
Endo, Tomizo; Sumida, Yutaka; Kawahara, Toru; Ohtake, Masaichi; Motokawa, Shoichi; Nagayama, Keiji; Shigeta, Masatomo; Hozuma, Hiroshi; Tomizawa, Masaharu; and Kikuchi, Hideo, 4,147,753, Cl. 422-202.000.

Shih, Arnold: *See—*
Haas, George A.; Greene, Richard F.; and Shih, Arnold, 4,147,515, Cl. 23-232.00E.

Shih, Kwang K.: *See—*
Fang, Frank F.; and Shih, Kwang K., 4,148,045, Cl. 357-17.000.

Shiina, Toshio, to Ricoh Company, Ltd. Sheet feed and positioning mechanism. 4,147,339, Cl. 271-7.000.

Shiino, Satoru: *See—*
Naito, Ryoichi; Inahara, Hirohisa; and Shiino, Satoru, 4,147,779, Cl. 424-195.000.

Shimada, Yasutaka: *See—*
Ijichi, Sadayoshi; and Shimada, Yasutaka, 4,147,991, Cl. 330-284.000.

Shimamura, Isao; and Iwano, Haruhiko, to Fuji Photo Film Co., Ltd. Prevention of fog formation in color photographic process. 4,147,546, Cl. 96-60.00R.

Shimano Industrial Company Limited: *See—*
Segawa, Takashi; and Fukui, Seiji, 4,147,243, Cl. 192-6.00A.
Segawa, Takashi; and Fukui, Seiji, 4,147,244, Cl. 192-6.00A.

Shimizu, Kisaburou: *See—*
Kobayashi, Akio; Shimohiro, Yoshiyuki; Shimizu, Kisaburou; and Murakami, Yoshiaki, 4,147,512, Cl. 8-165.000.

Shimizu, Noboru; Yanagisawa, Isao; Takata, Masahiro; and Sato, Takahisa, to Nippon Shokubai Kagaku Kogyo Co. Ltd. Process for producing acrylic acid from propylene. 4,147,885, Cl. 562-535.000.

Shimizu, Shotaro, to Citizen Watch Co., Ltd. Electrochromic display device. 4,147,416, Cl. 350-357.000.

Shimohiro, Yoshiyuki: *See—*
Kobayashi, Akio; Shimohiro, Yoshiyuki; Shimizu, Kisaburou; and Murakami, Yoshiaki, 4,147,512, Cl. 8-165.000.

Shimomura, Masaichi; and Horimoto, Mitsuaki, to Minolta Camera Kabushiki Kaisha. Two group wide angle zoom lens system. 4,147,410, Cl. 350-184.000.

Shimomura, Takatoshi: *See—*
Sano, Takezo; Shimomura, Takatoshi; Sasaki, Masao; and Murase, Ichiki, 4,147,745, Cl. 264-22.000.

Shionogi & Co., Ltd.: *See—*
Hirai, Kentaro; Fujishita, Toshio; Ishiba, Teruyuki; and Sugimoto, Hirohiko, 4,147,700, Cl. 260-308.00R.

Shiotani, Tomokazu, to Matsushita Electric Industrial Co., Ltd. Vertical deflection system for a television receiver. 4,147,963, Cl. 315-387.000.

Shiozawa, Ken: *See—*
Suzuki, Michio; and Shiozawa, Ken, 4,147,032, Cl. 60-290.000.

Shishkov, Igor M.: *See—*
Landa, Mikhail L.; Sinelnikov, Vladimir Y.; Stasenko, Rostislav F.; and Shishkov, Igor M., 4,148,086, Cl. 361-37.000.

Shoemaker, John R.: *See—*
Moser, Jessie L.; and Shoemaker, John R., 4,147,399, Cl. 339-99.00R.

Shohata, Nobuaki; Ohno, Tomeji; Ikeda, Shigeru; Fukushima, Takaki; Igarashi, Ryuji; and Yoshida, Jyun-Ichiro, to Nippon Electric Co., Ltd. Nonohmic ZnO ceramics including $Bi_2O_3$, CoO, MnO, $Sb_2O_3$, and borosilicate Pb and/or Zn glass components. 4,147,670, Cl. 252-519.000.

Shoketsu Kinzoku Kogyo Co., Ltd.: *See—*
Miura, Tomohiro, 4,147,179, Cl. 137-599.000.

Shoop, John C.; Post, Roger L.; and Herschler, Michael G., to Gardner-Denver Company. Control system for helical screw compressor. 4,147,475, Cl. 417-310.000.

Shpall, Richard T. Telephone guard. 4,147,903, Cl. 179-178.000.

Shpantseva, Ljudmila V.: *See—*
Gokhberg, Pavel Y.; Gorbunov, Boris N.; Khardin, Alexandr P.; Rudkovsky, Vladimir L.; Belyaev, Valentin M.; Lukashov, Anatoly I.; Shpantseva, Ljudmila V.; and Orlyansky, Vitaly V., 4,147,736, Cl. 260-681.000.

Shroff, Jayant R., to Bell Telephone Laboratories, Incorporated. Vented container. 4,147,841, Cl. 429-86.000.

Sichak, Stephen, to Scholl, Inc. Preparation for treating dermatitis in the nature of tinea pedis. 4,147,770, Cl. 424-45.000.

Siebenhofer, Gottfried; Mulner, Manfred; and Arbeithuber, Walter, to Vereinigte Osterreichische Eisen- und Stahlwerke - Alpine Montan Aktiengesellschaft. Swivel mechanism for kerf-cutting machines. 4,147,391, Cl. 299-75.000.

Siemens Aktiengesellschaft: *See—*
Baues, Peter; Mahlein, Hans; Moeckel, Peter; Reichelt, Achim; and Winzer, Gerhard, 4,147,979, Cl. 324-244.000.
Hassler, Heinrich; and Kippenberg, Horst, 4,147,909, Cl. 200-265.000.
Hochstetter, Werner, 4,147,972, Cl. 323-24.000.
Naeser, Helmut; and Nusser, Alban, 4,147,922, Cl. 219-216.000.
Pratsch, Rudolf; and Slamecka, Ernst, 4,147,975, Cl. 324-28.0CB.
Reichl, Helmut; and Schmidt, Ludwig, 4,147,401, Cl. 350-6.800.
Roessler, Bernward, 4,148,044, Cl. 357-23.000.
Rosenstock, Gunter, 4,148,041, Cl. 346-140.00R.
Schade, Reinhart, 4,147,579, Cl. 156-252.000.
Springer, Norbert; Oberhauser, Walter; and Sommer, Joachim, 4,147,897, Cl. 179-18.0AB.

Siemer, Dennis K.; and Farland, Swen E. Fail-safe alarm system utilizing frequency modulated signal detection. 4,148,020, Cl. 340-531.000.

Siewert, John: *See—*
Westra, Dan P.; and Siewert, John, 4,146,942, Cl. 11-1.00B.

Sifniades, Stylianos: *See—*
Koff, Fred W.; Tunick, Allen A.; and Sifniades, Stylianos, 4,147,623, Cl. 210-31.00R.

SIG Schweizerische Industrie-Gesellschaft: *See—*
Deutschlander, Gert, 4,147,583, Cl. 156-510.000.

Sillars, Frederick S., to USM Corporation. Side seam soldering machine with means for protecting pre-striping. 4,147,288, Cl. 228-43.000.

Sillion, Bernard: *See—*
Rabilloud, Guy; and Sillion, Bernard, 4,147,728, Cl. 260-590.00D.

Simich, Emil, to A. J. Gerrard & Company. Bale-tie wire. 4,147,188, Cl. 140-101.000.

Simmons, William A., Jr.: *See—*
Aldrich, Ralph E.; Cumming, William J.; and Simmons, William A., Jr., 4,147,656, Cl. 252-299.000.

Simonov, Anatoly N.: *See—*
Bystrov, Nikolai M.; Simonov, Anatoly N.; Levin, Alexandr B.; Meshkov, Jury K.; Zakharov, Anatoly A.; and Kolbanev, Alexei V., 4,147,527, Cl. 65-183.000.

Simpson, Paul K., to Sanders Associates, Inc. Material handling system. 4,147,369, Cl. 280-30.000.

Sims, David J.; and Miracle, Billy D., to Hewlett-Packard Company. Temperature compensated lens mount. 4,147,413, Cl. 350-253.000.

Sinelnikov, Vladimir Y.: *See—*
Landa, Mikhail L.; Sinelnikov, Vladimir Y.; Stasenko, Rostislav F.; and Shishkov, Igor M., 4,148,086, Cl. 361-37.000.

Singer, Arnold J.; Lover, Myron J.; Rhodes, William E., III; Bilodeau, William N.; and Lynch, Donald M., to Block Drug Company, Inc. Pediculicidal toxicants. 4,147,800, Cl. 424-312.000.

Singer Company, The: *See—*
Adams, Kenneth D., 4,147,118, Cl. 112-158.00E.
Dunn, William H., 4,147,119, Cl. 112-317.000.
Greenwood, Ivan A., 4,147,974, Cl. 324-0.50F.
Schaeflern, Henry, 4,147,043, Cl. 66-60.00R.

Sirius Corporation: *See—*
Fairbairn, Thomas E., 4,147,916, Cl. 219-121.00P.

Sizmur, Malcolm F.; Brewerton, David; and Mason, Brian W., to Racal-Dana Instruments Limited. Electrical signal generators. 4,147,993, Cl. 331-1.00A.

SKF Industrial Trading and Development Company B.V.: *See—*
Persson, Ake K., 4,147,209, Cl. 165-161.000.

Skillicorn, Douglas E., to B. F. Goodrich Company, The. Liquid vinylidene terminated polymers. 4,147,854, Cl. 526-312.000.

Skobel, Barry A., to S & S Medical Products Co., Inc. Handle for a medical instrument. 4,147,443, Cl. 403-267.000.

Skreosen, Ivar: *See—*
Heimdal, Ivar D.; and Skreosen, Ivar, 4,147,474, Cl. 417-54.000.

Skrovanek, Ambroz K.: *See—*
Gaetano, Mauro L.; and Skrovanek, Ambroz K., 4,147,900, Cl. 179-170.00R.

Slade, Owen G., to Carrier Corporation. Steering and propulsion means for ships or other vessels. 4,147,125, Cl. 115-14.000.

Slama, Francis J.; and Fielding, Ivor R., to Standard Oil Company (Indiana). Anti-drip additive system for fire retardant polypropylene. 4,147,741, Cl. 260-878.00R.

Slamecka, Ernst: *See—*
Pratsch, Rudolf; and Slamecka, Ernst, 4,147,975, Cl. 324-28.0CB.

Slazas, John J., to Allis-Chalmers Corporation. Resilient hitch linkage for connection between a towing vehicle and a towed apparatus. 4,147,376, Cl. 280-489.000.

Slobodzian, Gregory E.; Payne, Robert A.; and Fiedler, Wayne, to Stewart-Warner Corporation. High speed video display system including zoom feature. 4,148,073, Cl. 358-240.000.

Smiley, Charles F.; and Weirather, Robert R., to Harris Corporation. Automatic cable loss compensator for use in a television camera system. 4,148,069, Cl. 358-160.000.

Smirl, Richard L.: *See—*
Woollard, Gary A.; and Smirl, Richard L., 4,147,068, Cl. 74-230.17E.

Smirnova, Galina M.: *See—*
Pronko, Vladimir G.; Onosovsky, Evgeny V.; Chuvpilo, Albert V.; Zhuravleva, Irina N.; Korneev, Viktor A.; Klimenkov, Dmitry A.; Smirnova, Galina M.; Usanov, Vladimir V.; Ivanov, Jury I.; Chernyshev, Boris A.; Nikitkin, Vasily D.; Nikolaev, Anatoly F.; Trizno, Maya S.; Karkozov, Valery G.; Verkhoglyadova, Tatyana J.; Moskalev, Evgeny V.; and Yakovleva, Lidia I., 4,147,210, Cl. 165-165.000.

Smith, Alfred H., Jr., to General Electric Company. Primer compositions for adhering silicone compositions. 4,147,685, Cl. 260-31.20R.

Smith, Eugene L., Jr.: *See—*
Wang, Samuel S.; Smith, Eugene L., Jr.; and Huliganga, Ernie F., 4,147,644, Cl. 252-61.000.

Smith, Herman W., to Upjohn Company, The. $\omega$-aryl-6-hydroxy-$PGE_1$ compounds. 4,147,877, Cl. 560-53.000.

Smith, Herman W., to Upjohn Company, The. 2,2-Difluoro-13,14 didehydro-$PGF_1$ compounds. 4,147,879, Cl. 560-121.000.

Smith, Horace L., Jr., to Smitherm Industries, Inc. Continuous web drying. 4,146,972, Cl. 34-41.000.

Smith, Larry C.; and Nienhaus, Alan M., to Rexnord Inc. Shaft seal for bearing housing. 4,147,367, Cl. 277-152.000.

Smith, Marjorie A. M. Vehicle with stuffed wheel, and method of making. 4,146,992, Cl. 46-221.000.

Smith, Roy B. Timing circuit for a chassis lubricator. 4,147,233, Cl. 184-29.000.
Smith, Warren F.: *See—*
Winter, Joseph; Shapiro, Eugene; and Smith, Warren F., 4,147,089, Cl. 90-24.00R.
Winter, Joseph; Shapiro, Eugene; and Smith, Warren F., 4,147,090, Cl. 90-24.00R.
Smith, Wayne L.; and Wolf, Roger P., to Mine Safety Appliances Company. Filter unit. 4,147,524, Cl. 55-521.000.
Smitherm Industries, Inc.: *See—*
Smith, Horace L., Jr., 4,146,972, Cl. 34-41.000.
SmithKline Corporation: *See—*
Berges, David A., 4,147,701, Cl. 260-308.00D.
Snamprogetti S.p.A.: *See—*
Bertaccini, Gianpaolo, 4,147,455, Cl. 405-172.000.
Snyder, Clair W., Jr.; Paullus, Clarence L.; and Derr, Paul B., to AMP Incorporated. Contact retention device. 4,147,400, Cl. 339-217.00S.
Snyder, Dale: *See—*
Halma, Wayne; and Snyder, Dale, 4,147,301, Cl. 237-8.00R.
Societa Italiana Telecomunicazioni Siemens S.p.A.: *See—*
Fenoglio, Francesco, 4,147,895, Cl. 179-15.0AF.
Meroni, Umberto, 4,148,088, Cl. 361-93.000.
s.a. Texaco Belgium n.v.: *See—*
Dulog, Lothar G.; and Maasbol, Alfred G., 4,147,673, Cl. 252-548.000.
Societe d'Etudes de Machines Thermiques: *See—*
Haug, Albert, 4,147,138, Cl. 123-41.410.
Societe Industrielle de Mecanique: *See—*
Puyplat, Olivier, 4,147,565, Cl. 148-6.15R.
Societe Nationale d'Etude et de Construction de Moteurs d'Aviation: *See—*
Holz, Robert G.; Lesieux, Jean-Robert; and Pigot, Maurice R., 4,147,945, Cl. 310-115.000.
Soderberg, Mark S.: *See—*
Gaunt, Frank L.; Hill, Horace E.; and Soderberg, Mark S., 4,147,232, Cl. 184-1.00E.
Sokolov, Boris G.; and Zaboronok, Georgy F. Electron-beam apparatus for thermal treatment by electron bombardment. 4,147,915, Cl. 219-121.0EB.
Sokolov, Vladislav I.: *See—*
Gorodissky, Leonid G.; Evtikhovich, Stanislav M.; Grigoriev, Igor P.; Kvashnin, Nikolai A.; Sokolov, Vladislav I.; Chekreneva, Larisa S.; Birdus, Rostislav G.; Zaitseva, Maria A.; Kryazhev, Jury T.; Kuzminova, Galina V.; and Romanov, Nikolai T., deceased, 4,147,366, Cl. 277-22.000.
Solomon, Frank; and Grun, Charles, to Diamond Shamrock Corporation. Electrochemical cell with stirred slurry. 4,147,839, Cl. 429-15.000.
Solution Sciences, Inc.: *See—*
Jesse, William L. M., 4,148,057, Cl. 358-4.000.
Sommer, Joachim: *See—*
Springer, Norbert; Oberhauser, Walter; and Sommer, Joachim, 4,147,897, Cl. 179-18.0AB.
Sommer, Owsin: *See—*
Schiller, August; Dorsch, Norman; and Sommer, Owsin, 4,147,855, Cl. 528-23.000.
Sonetaka, Kazunori: *See—*
Nishino, Atsushi; Sonetaka, Kazunori; Kimura, Kunio; and Ikeda, Nasaki, 4,147,835, Cl. 428-450.000.
Sony Corporation: *See—*
Okada, Hidehiko; Morio, Minoru; Kambara, Masahiro; and Kubota, Yukio, 4,148,082, Cl. 360-77.000.
Tozune, Toshimasa; and Hanzawa, Hisashi, 4,147,898, Cl. 179-100.110.
Watanabe, Yoshimi, 4,148,083, Cl. 360-77.000.
South African Inventions Development Corporation, The: *See—*
Jeffery, Brian S., 4,147,448, Cl. 404-124.000.
Southerland, Hugh E.: *See—*
Harden, David R.; and Southerland, Hugh E., 4,147,310, Cl. 242-25.00A.
Southern, Raymond L.; Benford, James G.; Petarra, Steve; Holbein, Robert D.; and Vince, Albert F., to Allegheny Ludlum Industries, Inc. Method and apparatus for heating coils of strip. 4,147,506, Cl. 432-148.000.
Spainhour, Carroll D., to Western Electric Co., Inc. Apparatus for aligning articles. 4,147,405, Cl. 350-96.210.
Spatz Corporation: *See—*
Spatz, Walter B., 4,147,280, Cl. 222-179.500.
Spatz, Walter B., to Spatz Corporation. Pump device for dispensing fluids. 4,147,280, Cl. 222-179.500.
Specht, Donald P.; and Farid, Samir Y., to Eastman Kodak Company. Light-sensitive compositions with 3-substituted coumarin compounds as spectral sensitizers. 4,147,552, Cl. 96-115.00R.
Speckter, Hans E. Radar reflector for buoys and other floating objects. 4,148,033, Cl. 343-18.00C.
Spector, George: *See—*
Missale, Maria; and Spector, George, 4,147,281, Cl. 222-192.000.
SpectraMetrics, Incorporated: *See—*
Hildebrand, Karl J., 4,147,957, Cl. 315-111.200.
Spencer, Lloyd: *See—*
Christy, Mark H.; and Spencer, Lloyd, 4,147,307, Cl. 239-542.000.
Spencer, Robert W.: *See—*
Kovanda, Robert J.; Maliar, Serge, Jr.; and Spencer, Robert W., 4,147,657, Cl. 252-313.00S.
Sperry Rand Corporation: *See—*
Flowers, Theodore R.; and Pires, Antonio, 4,146,960, Cl. 30-195.000.
Spethmann, Donald H., to Honeywell Inc. Proportional demand limit controller. 4,147,296, Cl. 236-1.00B.
Spiker, Van P.: *See—*
Bata, George T.; and Spiker, Van P., 4,147,205, Cl. 165-26.000.
Spiralux Limited: *See—*
Fluester, James F., 4,147,047, Cl. 72-114.000.
Sport Fishing Fineries, Inc.: *See—*
Vanus, Anthony M.; and Vanus, Jerome W., 4,146,989, Cl. 43-55.000.
Sprague Electric Company: *See—*
Gontowski, Walter S., Jr., 4,147,996, Cl. 331-111.000.
Sprecker, Mark A.; Vock, Manfred H.; Schmitt, Frederick L.; Hall, John B.; and Sanders, James M., to International Flavors & Fragrances Inc. 1-Butenoyl-3,3-dimethylcyclohexane mixtures. 4,147,727, Cl. 260-586.00R.
Sprigg, E. Glenn; Couch, Everett O.; and Hendrix, Shelby D. Multiple pulley bin jack. 4,147,328, Cl. 254-89.00R.
Springer, Norbert; Oberhauser, Walter; and Sommer, Joachim, to Siemens Aktiengesellschaft. Circuit for telephone auxiliary exchanges having delayed connection of a busy signal set. 4,147,897, Cl. 179-18.0AB.
SRI International: *See—*
Magee, Thomas J.; Pettijohn, Richard R.; Stewart, Shelley A.; and Thackray, Malcolm, 4,147,564, Cl. 148-1.500.
Staat, Karl-Hans, to Friedrich Kocks GmbH & Company. Linear drives. 4,147,067, Cl. 74-29.000.
Stadler, Paul: *See—*
Stutz, Peter; and Stadler, Paul, 4,147,789, Cl. 424-261.000.
Stagehand Associates: *See—*
Bruce, Jeffrey S., 4,147,254, Cl. 206-314.000.
Stahli, Paul, to Geberit AG. Electrical heatable muff and process for its manufacture. 4,147,926, Cl. 219-535.000.
Stakhov, Alexei P. Cathode-ray tube display. 4,148,074, Cl. 358-242.000.
Stalzer, Josef: *See—*
Korner, Jorg-Peter; Stalzer, Josef; Dornhoff, Gunther; and Kopl, Manfred, 4,147,517, Cl. 422-242.000.
Standard Oil Company (Indiana): *See—*
Hollingsworth, Frank H., 4,147,213, Cl. 166-256.000.
Slama, Francis J.; and Fielding, Ivor R., 4,147,741, Cl. 260-878.00R.
Worrell, J. Robert; and Berman, Mark Y., 4,147,036, Cl. 405-205.000.
Stanley Drug Products, Inc.: *See—*
Cook, Elton S.; and Fujii, Akira, 4,147,802, Cl. 424-319.000.
Stasenko, Rostislav F.: *See—*
Landa, Mikhail L.; Sinelnikov, Vladimir Y.; Stasenko, Rostislav F.; and Shishkov, Igor M., 4,148,086, Cl. 361-37.000.
Stassen, William N.: *See—*
Cohen, Eleanor B.; Stassen, William N.; and Wintgens, James C., 4,147,555, Cl. 106-99.000.
Stauffer Chemical Company: *See—*
Goswami, Jagadish C.; and Querido, Robert, 4,147,853, Cl. 526-278.000.
Kaniecki, Thaddeus J., 4,147,652, Cl. 252-156.000.
Tilles, Harry; and Hoch, Paul E., 4,147,715, Cl. 260-455.00A.
Steckstor, Rolf: *See—*
Torwegge, Helmut; and Steckstor, Rolf, 4,147,192, Cl. 144-251.00R.
Stedman, Robert N., to Caterpillar Tractor Co. Bulldozer attachment for four-tracked tractor. 4,147,218, Cl. 172-803.000.
Steele, Everett T., Jr., to Robertshaw Controls Company. Condition responsive valve construction. 4,147,180, Cl. 137-599.200.
Steffen, Hermann; and Weiler, Rolf, to ITT Industries, Inc. Pad wear indicating arrangement. 4,147,236, Cl. 188-1.00A.
Steffensen, Leslie M.; Dutell, H. Gary; and Rydell, Robert A., to Georgia-Pacific Corporation. Method and apparatus for drying veneer. 4,146,973, Cl. 34-41.000.
Steiner, Herbert A.: *See—*
Rubel, Ira A.; Steiner, Herbert A.; and Ritter, Charles H., 4,147,050, Cl. 73-1.00H.
Steiner, Peter, to Foster Wheeler Energy Corporation. Reduction of $SO_2$ with coal. 4,147,762, Cl. 423-569.000.
Stenner, Irving H.; and Nelson, John M., to Bernzomatic Corporation. Pressure relief device. 4,147,272, Cl. 220-89.00B.
Stephan, Wolfgang; and Kotitschke, Ronald, to Biotest-Serum-Institut GmbH. Preparation of antiserum for quantitative determination of X and Y degradation products of fibrin and fibrinogen. 4,147,765, Cl. 424-12.000.
Sterling Drug, Inc.: *See—*
Harrison, Thomas S.; and Doyle, Ross L., 4,147,441, Cl. 401-208.000.
Margulies, Herman, 4,146,985, Cl. 40-158.00B.
Stevens, John E., to F. A. Hughes and Co., Ltd. Impressed current cathodic protection. 4,147,608, Cl. 204-196.000.
Stevens, Robert L. Anti-theft parking system. 4,147,246, Cl. 194-9.00T.
Stevenson, Robert A.: *See—*
Colburn, Richard H.; Anderhalt, Donald A.; and Stevenson, Robert A., 4,148,003, Cl. 333-181.000.
Stewart, James B.: *See—*
Molnar, John A.; Stewart, James B.; and Schmidt, Sheldon P., 4,147,133, Cl. 119-55.000.
Stewart, James F., to Pako Corporation. Variable working distance

photographic printer with stationary paper magazines. 4,147,427, Cl. 355-72.000.

Stewart, Roy, to British Nuclear Fuels Ltd. Powder compacting presses. 4,147,490, Cl. 425-355.000.

Stewart, Shelley A.: *See—*
Magee, Thomas J.; Pettijohn, Richard R.; Stewart, Shelley A.; and Thackray, Malcolm, 4,147,564, Cl. 148-1.500.

Stewart-Warner Corporation: *See—*
Slobodzian, Gregory E.; Payne, Robert A.; and Fiedler, Wayne, 4,148,073, Cl. 358-240.000.

Stillman, Neil W.: *See—*
Schenker, Barry A.; Sugano, Thomas T.; Stillman, Neil W.; and O'Leary, Kevin J., 4,147,605, Cl. 204-180.00P.

Stohr, Gunter: *See—*
Kratel, Gunter; Stohr, Gunter; Eberle, Ludwig; and Muhlhofer, Ernst, 4,147,760, Cl. 423-336.000.

Stoll, James W.: *See—*
Castro, Anthony J.; and Stoll, James W., 4,147,742, Cl. 260-897.00R.

Stolper, Richard, to General Motors Corporation. Motor vehicle seat. 4,147,386, Cl. 297-362.000.

Stolyarov, Alexei V.: *See—*
Bufalov, Gimn V.; Sarantsev, Kir B.; Bogoradovsky, Gennady I.; Titensky, Vladimir I.; Stolyarov, Alexei V.; Bavelsky, David M.; and Burdin, Alexandr A., 4,147,473, Cl. 417-53.000.

Stolzke, Paul A.: *See—*
Fling, William F.; and Stolzke, Paul A., 4,147,060, Cl. 73-321.000.

Stone, Roger N.: *See—*
Griffiths, John S.; and Stone, Roger N., 4,147,051, Cl. 73-32.00R.

Storage Technology Corporation: *See—*
Cannon, Thomas B.; and O'Neill, John F., 4,147,896, Cl. 179-15.0AS.

Stork Amsterdam B.V.: *See—*
Witte, Johan F., 4,147,098, Cl. 99-477.000.

Stork PMT B.V.: *See—*
van Mil, Martinus P. G., 4,147,012, Cl. 53-468.000.

Stout, James T., to Mead Corporation, The. Article carrier handle structure. 4,147,290, Cl. 229-52.00B.

Straitz, John F., III, to Combustion Unlimited Incorporated. Igniter for flares. 4,147,493, Cl. 431-15.000.

Straitz, John F., III. Waste gas dispersion stack. 4,147,495, Cl. 431-23.000.

Strewtex Fabrics Limited: *See—*
Holland, Brian C., 4,147,829, Cl. 428-311.000.

Stringfellow, Gerald B.; and Hall, Howard T., Jr., to Hewlett-Packard Company. Method for vapor epitaxial deposition of III/V materials utilizing organometallic compounds and a halogen or halide in a hot wall system. 4,147,571, Cl. 148-175.000.

Strop, William H. Golf putter head. 4,147,357, Cl. 273-164.000.

Struble, Dean L.; and Swailes, G. Edward, to Canadian Patents and Development Limited. Attractant for army cutworm moths. 4,147,771, Cl. 424-84.000.

Strunc, Gerald R.: *See—*
Diesch, Robert E.; and Strunc, Gerald R., 4,147,080, Cl. 83-371.000.

Stuckmann, Dieter: *See—*
Unger, Eberhart; Jutle, Hans; and Stuckmann, Dieter, 4,147,453, Cl. 405-141.000.

Stutz, Peter; and Stadler, Paul, to Sandoz Ltd. 6-Methyl-8-thiomethyl-ergolene derivatives. 4,147,789, Cl. 424-261.000.

Sugano, Thomas T.: *See—*
Schenker, Barry A.; Sugano, Thomas T.; Stillman, Neil W.; and O'Leary, Kevin J., 4,147,605, Cl. 204-180.00P.

Sugawara, Shinichi: *See—*
Miyadera, Tetsuo; Nagano, Mitsuo; and Sugawara, Shinichi, 4,147,863, Cl. 542-436.000.

Sugimoto, Hirohiko: *See—*
Hirai, Kentaro; Fujishita, Toshio; Ishiba, Teruyuki; and Sugimoto, Hirohiko, 4,147,700, Cl. 260-308.00R.

Sugiura, Akio: *See—*
Nojiri, Tadao; and Sugiura, Akio, 4,147,295, Cl. 235-463.000.

Sulzer Brothers Limited: *See—*
Andrea, Simon, 4,147,149, Cl. 123-188.00S.
Naegelin, Roland, 4,147,208, Cl. 165-159.000.
Wachter, Erich, 4,147,382, Cl. 285-189.000.

Sumi, Akira: *See—*
Yamauchi, Mineo; and Sumi, Akira, 4,148,043, Cl. 346-157.000.

Sumida, Yutaka: *See—*
Endo, Tomizo; Sumida, Yutaka; Kawahara, Toru; Ohtake, Masaichi; Motokawa, Shoichi; Nagayama, Keiji; Shigeta, Masatomo; Hozuma, Hiroshi; Tomizawa, Masaharu; and Kikuchi, Hideo, 4,147,753, Cl. 422-202.000.

Sumitomo Chemical Company Limited: *See—*
Aoyagi, Masaya; Hayashi, Mikio; Yoshida, Yasuyuki; and Yao, Yoshiaki, 4,146,936, Cl. 3-1.910.
Bai, Yasuo; Yanagi, Hideki; Yoshikawa, Junichi; and Ogino, Shigeo, 4,147,592, Cl. 195-66.00B.
Sagawa, Seiji; Numata, Kenichiro; and Kondo, Hisanori, 4,147,696, Cl. 546-198.000.
Sano, Takezo; Shimomura, Takatoshi; Sasaki, Masao; and Murase, Ichiki, 4,147,745, Cl. 264-22.000.

Sumpter, Alray. Directional control coupling mechanism. 4,147,372, Cl. 280-433.000.

Sundstrand Corporation: *See—*
Linscott, Phillip S., Jr.; and Schmohe, James S., 4,147,946, Cl. 310-214.000.

Sundstrand Data Control, Inc.: *See—*
Muller, Hans R., 4,147,056, Cl. 73-178.00T.

Suni, Jukka: *See—*
Suovaniemi, Osmo A.; Ekholm, Pertti; Suni, Jukka; and Jarnefelt, Johan, 4,147,752, Cl. 422-57.000.

Sunworks, Inc.: *See—*
Hopper, Thomas P., 4,147,156, Cl. 126-271.000.

Suovaniemi, Osmo A.; Ekholm, Pertti; Suni, Jukka; and Jarnefelt, Johan, to Kommandiittihytio Finnpipette Osmo A. Souvaniemi. Form piece for apparatuses used for immunoassays and enzyme reactions. 4,147,752, Cl. 422-57.000.

Suslin, Vladimir I.; Dubovik, Alexandr I.; Makeev, Boris A.; Pilipenko, Vitaly A.; Lekarev, Zinovy A.; and Kolyshkin, Boris S. Apparatus for electrochemical machining of metal parts. 4,147,609, Cl. 204-224.00M.

Sutton, Harry G., Jr.: *See—*
Roman, Walter G.; and Sutton, Harry G., Jr., 4,147,589, Cl. 176-36.00C.

Suzuki, Hiroshi: *See—*
Osumi, Yasuaki; Suzuki, Hiroshi; Kato, Akihiko; Nakane, Masanori; and Miyake, Yoshizo, 4,147,536, Cl. 75-134.00F.

Suzuki, Kensuke: *See—*
Matsunaga, Akira; and Suzuki, Kensuke, 4,148,056, Cl. 357-73.000.

Suzuki, Michio; and Shiozawa, Ken, to Toyota Jidosha Kogyo Kabushiki Kaisha. Secondary air supply control system. 4,147,032, Cl. 60-290.000.

Suzuki, Takao: *See—*
Yamawaki, Masao; Aoki, Katsuo; Oka, Yoshio; Suzuki, Takao; Amano, Masahiko; Ozaki, Hideki; and Ishihara, Osamu, 4,147,432, Cl. 118-49.100.

Swailes, G. Edward: *See—*
Struble, Dean L.; and Swailes, G. Edward, 4,147,771, Cl. 424-84.000.

Swann, David A. Electric switches. 4,147,908, Cl. 200-67.00G.

Swiderski, Walter L., Jr.; O'Brien, John J.; and Kershner, Stuart D., to Olin Corporation. Connector for lanyard wire to clip over trigger. 4,147,220, Cl. 173-170.000.

Swiercinsky, Gary L.: *See—*
Deines, Siegmund; Swiercinsky, Gary L.; and Engstrom, Craig E., 4,147,631, Cl. 210-137.000.

Swiger, Roger T.; and Juliano, Peter C., to General Electric Company. Graft modified polyethylene process and product. 4,147,740, Cl. 260-878.00R.

Syrowatka, Rupert: *See—*
Heissenberger, Otto; Syrowatka, Rupert; and Tutschek, Ernst, 4,147,101, Cl. 100-118.000.

Systron-Donner Corporation: *See—*
Bower, Gerald S.; Peters, Rex B.; and Morris, Harold D., 4,147,063, Cl. 73-504.000.

Szekely, Thomas, to United States of America, Energy. Nuclear propulsion apparatus with alternate reactor segments. 4,147,590, Cl. 176-39.000.

Tabb, David L.: *See—*
Magers, Thomas A.; and Tabb, David L., 4,147,514, Cl. 23-230.00B.

Takada, Toshio: *See—*
Iwase, Keizo; Takada, Toshio; and Bando, Yoshichika, 4,147,747, Cl. 264-65.000.

Takahashi, Nagao: *See—*
Yatsurugi, Yoshifumi; Yusa, Atsushi; and Takahashi, Nagao, 4,147,814, Cl. 472-51.000.

Takahashi, Sohya: *See—*
Mori, Shigeo; Murakami, Fumikazu; Hara, Yoshiaki; Horikoshi, Ichiro; and Takahashi, Sohya, 4,147,899, Cl. 179-116.000.

Takakura, Kintomo: *See—*
Ikebe, Jun; Kumagai, Yoriaki; Takakura, Kintomo; and Ohta, Michio, 4,147,161, Cl. 128-2.00R.

Takata, Masahiro: *See—*
Shimizu, Noboru; Yanagisawa, Isao; Takata, Masahiro; and Sato, Takahisa, 4,147,885, Cl. 562-535.000.

Takeda, Mamoru: *See—*
Ogasawara, Toshiya; Kubo, Norimasa; Nagino, Hiroshi; Takeda, Mamoru; and Ochiishi, Masanori, 4,147,452, Cl. 405-134.000.

Takei, Haruo: *See—*
Sato, Akira; Ikeda, Tadashi; Sakai, Takeo; Takei, Haruo; and Hayashi, Jun, 4,147,553, Cl. 96-122.000.

Takemoto, Iwao; Koike, Norio; and Kubo, Masaharu, to Hitachi, Ltd. Solid-state imaging device. 4,148,048, Cl. 357-30.000.

Takemoto, Iwao: *See—*
Koike, Norio; Takemoto, Iwao; and Kubo, Masaharu, 4,148,051, Cl. 357-30.000.

Takeshima, Hideo: *See—*
Umezawa, Iwao; Komiyama, Kanki; and Takeshima, Hideo, 4,147,774, Cl. 424-118.000.

Takeuchi, Tomio: *See—*
Umezawa, Hamao; Takeuchi, Tomio; Hamada, Masa; Ishizuka, Masaaki; Naganawa, Hiroshi; Oki, Toshikazu; and Inui, Taiji, 4,147,778, Cl. 424-181.000.

Talalay, Anselm. Polymeric foam cushioning article and method for making the same. 4,147,825, Cl. 418-138.000.

Talsma, Robert C.: *See—*
Adamski, Maximilian, Jr.; Talsma, Robert C.; and Walters, Richard E., 4,147,120, Cl. 112-318.000.

Talucci, Anthony. Heat-saving smoke pipe attachment. 4,147,303, Cl. 237-55.000.

Tamosauskas, Albert E.: *See*—
Eilerman, George E.; and Tamosauskas, Albert E., 4,147,833, Cl. 428-378.000.
Tanaka, Akira; Nakatani, Mamoru; and Yoshida, Akio, to Mitsubishi Paper Mills, Ltd. Direct-positive photographic silver halide emulsion. 4,147,554, Cl. 96-130.000.
Tanaka, Taro: *See*—
Noguchi, Masaaki; Bunda, Tsuchio; and Tanaka, Taro, 4,147,136, Cl. 123-3.000.
Tanuma, Takeshi; and Harada, Masanori, to Nissan Motor Company, Limited. Internal combustion engine with exhaust gas recirculation system. 4,147,031, Cl. 60-278.000.
Tasato, Noboru. Adjustable locking wrench. 4,147,077, Cl. 81-367.000.
Tashiro, Yasunori; Yashiro, Takahiro; and Higuchi, Katsuaki, to Rheon Automatic Machinery Co., Ltd. Apparatus for automatically manufacturing cupped food materials. 4,147,014, Cl. 53-559.000.
Tauschinski, Stefan O. Separable needle for inserting a catheter into the blood stream. 4,147,165, Cl. 128-214.400.
Tausworthe, Robert C.: *See*—
Fletcher, James C.; Tausworthe, Robert C.; and Chernoff, Ralph C., 4,148,031, Cl. 343-100.0TD.
Taylor, David L.: *See*—
Petrovich, John P.; and Taylor, David L., 4,147,586, Cl. 162-135.000.
Taylor, Glenn N., to Kendall Company, The. Balloon catheter with balloon retaining sleeves. 4,147,169, Cl. 128-349.00B.
Taylor, Glenn N., to Kendall Company, The. Catheter with inflation control device. 4,147,170, Cl. 128-349.0BV.
Taylor, Gordon A.: *See*—
Kelly, John D.; Hammond, Wayne S.; and Taylor, Gordon A., 4,148,032, Cl. 343-18.00A.
Taylor, Henry F., to United States of America, Navy. Optical photoemissive detector and photomultiplier. 4,147,929, Cl. 250-207.000.
Taylor, Richard J., to Micro Consultants Limited. Video processing system. 4,148,070, Cl. 358-160.000.
Technical Services Company-Tesco S.p.A.: *See*—
Rovera, Mario; and Proverbio, Giuseppe, 4,147,483, Cl. 425-65.000.
Tecno-Planning Italia Di Giulini e Zambiasi: *See*—
Zambiasi, Franco, 4,146,976, Cl. 35-24.00R.
TECO, Inc.: *See*—
Johnson, Leonard L., 4,146,998, Cl. 52-115.000.
Tecumseh Products Company: *See*—
Morse, Robert L., 4,147,479, Cl. 417-540.000.
Tekade Felten & Guilleaume Fernmeldeanlagen GmbH: *See*—
Braak, Dirk J., 4,148,038, Cl. 343-858.000.
Tekkosho, Ikio: *See*—
Masuda, Yukio; and Naoi, Hiroshi, 4,147,595, Cl. 202-241.000.
Tektronix, Inc.: *See*—
Hall, Dennis R., 4,147,988, Cl. 328-124.000.
Mutton, Jon C.; and Unger, Peter J., 4,148,042, Cl. 346-155.000.
Teledyne Industries, Inc.: *See*—
Deines, Siegmund; Swiercinsky, Gary L.; and Engstrom, Craig E., 4,147,631, Cl. 210-137.000.
Telefonaktiebolaget L M Ericsson: *See*—
Roos, Sture G., 4,147,891, Cl. 178-69.100.
Teleglobe Pay-TV System, Inc.: *See*—
Chomet, Marc, 4,148,063, Cl. 358-114.000.
Telex Communications, Inc.: *See*—
Carpenter, Michael P.; and D'Amico, Paul M., 4,147,904, Cl. 179-178.000.
Terashima, Isamu, to Hitachi, Ltd. Toner concentration detecting apparatus. 4,147,127, Cl. 118-646.000.
Terry, Milton E.: *See*—
Kerns, Becky T.; Logan, Walter; McKnight, Lee G.; Ostermayer, Frederick W., Jr.; and Terry, Milton E., 4,148,089, Cl. 361-119.000.
Testa, Frank J., to Lori Engineering Corporation. Combination lock with scrambler. 4,147,045, Cl. 70-314.000.
Teutsch, Jean G., to Roussel Uclaf. 11$\beta$-Substituted-$\Delta^9$-steroids. 4,147,695, Cl. 260-239.55C.
Texaco Development Corp.: *See*—
Waddill, Harold G.; and Schulze, Heinz, 4,147,857, Cl. 528-94.000.
Texaco Inc.: *See*—
Dorawala, Tansukhlal G.; Kerr, Edwin R.; Kochis, Robert G.; and Koniz, Leon F., 4,147,734, Cl. 260-672.00R.
Kalfoglou, George, 4,147,214, Cl. 166-273.000.
Love, Richard F.; Kerr, Edwin R.; and Knifton, John F., 4,147,730, Cl. 260-604.0HF.
Powers, John R., 4,146,950, Cl. 29-157.00R.
Savoit, Robert E.; and Henry, Clemence J., 4,147,658, Cl. 252-384.000.
Texas Instruments Incorporated: *See*—
Baboian, Robert; and Haynes, Gardner S., 4,147,596, Cl. 204-1.00T.
Burson, David C., 4,148,014, Cl. 340-709.000.
Caudel, Edward R.; Wilson, William R.; and Merrow, Thomas E., 4,147,984, Cl. 325-25.000.
Textron, Inc.: *See*—
Book, Walter R.; and Putetti, Anthony M., 4,147,049, Cl. 72-349.000.
Thacker, Charles P.: *See*—
McCreight, Edward M.; and Thacker, Charles P., 4,148,098, Cl. 364-200.000.
Thackray, Malcolm: *See*—
Magee, Thomas J.; Pettijohn, Richard R.; Stewart, Shelley A.; and Thackray, Malcolm, 4,147,564, Cl. 148-1.500.
Thermal Engineering Company: *See*—
Vollman, Leonard L., 4,147,607, Cl. 204-196.000.
Thiel, Alfons W.; and Heil, Hans, to Bellapast GmbH. Machine press, specifically a stamping press. 4,147,492, Cl. 425-394.000.
Thiele, John R.: *See*—
Olsen, Richard J.; Brinkley, Max D.; and Thiele, John R., 4,147,482, Cl. 425-46.000.
Thiokol Corporation: *See*—
Holmes, Wayne W., 4,147,114, Cl. 110-221.000.
Thomas Industries Inc.: *See*—
Durkee, John E., 4,148,019, Cl. 340-531.000.
Thomas, Richard N.: *See*—
Nathanson, Harvey C.; and Thomas, Richard N., 4,148,052, Cl. 357-30.000.
Thompson Bagel Machine Mfg. Corporation: *See*—
Thompson, Daniel T., 4,147,809, Cl. 426-499.000.
Thompson, Daniel T., to Thompson Bagel Machine Mfg. Corporation. Method and apparatus for sizing and forming dough bodies. 4,147,809, Cl. 426-499.000.
Thompson, John W.; and Wang, Richard H. S., to Eastman Kodak Company. Trifunctional antioxidant for polyolefins. 4,147,689, Cl. 260-45.9NC.
Thompson, Wallace W.: *See*—
Frankel, Milton B.; Raniere, Frederick D.; Thompson, Wallace W.; Witucki, Edward F.; and Woolery, Dean O., II, 4,147,731, Cl. 260-644.000.
Thomson-CSF: *See*—
Alizon, Etienne; and Picquendar, Jean E., 4,148,016, Cl. 340-347.0DA.
d'Auria, Luigi; Jacques, Andre; and Moronvalle, Chantal, 4,147,403, Cl. 350-96.180.
Dubois, Jean-Claude; Nguyen, Huu T.; and Zann, Annie, 4,147,655, Cl. 252-299.000.
Gendreu, Robert, 4,148,026, Cl. 343-5.0ST.
Rougeot, Henri; and Roziere, Guy, 4,147,933, Cl. 250-370.000.
Thoren, Glenn R.; Lampen, James L.; and Jerinic, George, to Raytheon Company. Power combiner. 4,147,994, Cl. 331-56.000.
Thorwaldson, Waldemar S. Temperature controlled instantaneous water heating apparatus. 4,147,159, Cl. 126-351.000.
Thyssen Industrie AG: *See*—
Koppers, Manfred; and Oppenlander, Harry, 4,147,459, Cl. 405-303.000.
Tilles, Harry; and Hoch, Paul E., to Stauffer Chemical Company. Thiocarbamate preparation utilizing quaternary ammonium salt catalysts. 4,147,715, Cl. 260-455.00A.
Tisdale, Vernon R., to Sherwin-Williams Co., The. Control of hydrogen sulfide gas to reduce toxicity and corrosion due to exposures thereto. 4,147,212, Cl. 166-244.00C.
Titensky, Vladimir I.: *See*—
Bufalov, Gimn V.; Sarantsev, Kir B.; Bogoradovsky, Gennady I.; Titensky, Vladimir I.; Stolyarov, Alexei V.; Bavelsky, David M.; and Burdin, Alexandr A., 4,147,473, Cl. 417-53.000.
Toa Harbor Works Co., Ltd.: *See*—
Norisugi, Makoto, 4,146,982, Cl. 37-64.000.
Toagosei Chemical Industry Co., Ltd.: *See*—
Yada, Akira; Iijima, Isamu; Itakura, Jo; and Fujikura, Saburo, 4,147,682, Cl. 260-29.6SQ.
Toenshoff, Donald A., to Engelhard Minerals & Chemicals Corporation. Thick film resistance thermometer. 4,146,957, Cl. 29-612.000.
Tokico Ltd.: *See*—
Hayashida, Yoshihiro, 4,147,091, Cl. 91-376.00R.
Tokyo Shibaura Electric Co., Ltd.: *See*—
Fujiwara, Tatsuo, 4,146,956, Cl. 29-603.000.
Tokyokikaikakogyo Kabushikikaisha: *See*—
Abe, Masakatsu, 4,147,811, Cl. 426-634.000.
Tomimasu, Takio; and Chiwaki, Mitukuni, to Agency of Industrial Science & Technology. Device for measuring high-level ionizing radiation dose. 4,147,934, Cl. 250-370.000.
Tomisawa, Norio, to Nippon Gakki Seizo Kabushiki Kaisha. Device for detecting a key switch operation. 4,148,017, Cl. 340-365.00S.
Tomizawa, Masaharu: *See*—
Endo, Tomizo; Sumida, Yutaka; Kawahara, Toru; Ohtake, Masaichi; Motokawa, Shoichi; Nagayama, Keiji; Shigeta, Masatomo; Hozuma, Hiroshi; Tomizawa, Masaharu; and Kikuchi, Hideo, 4,147,753, Cl. 422-202.000.
Tomoyuki, Osada: *See*—
Kotaro, Ishii; Masahiko, Mitsutsuka; and Tomoyuki, Osada, 4,147,332, Cl. 266-44.000.
Tomy Kogyo Co., Inc.: *See*—
Saito, Makoto, 4,147,351, Cl. 273-86.00B.
Sano, Hiroshi, 4,146,991, Cl. 46-202.000.
Usami, Hikoo, 4,147,350, Cl. 273-85.00R.
Toorisawa, Soichi: *See*—
Nakagawa, Kiyoshi; Toorisawa, Soichi; Ibe, Hiroyuki; Nakashima, Shigeaki; and Hara, Yasuhiko, 4,148,065, Cl. 358-101.000.
Topfl, Rosemarie, to Ciba-Geigy AG. Process for surface-sizing papers with maleic anhydride copolymers. 4,147,585, Cl. 162-135.000.
Torikoshi, Seiko: *See*—
Hayami, Masaaki; and Torikoshi, Seiko, 4,147,862, Cl. 542-415.000.
Torres, Silvestre S. Composition of material for a rust-resistant steel for use at high temperatures. 4,147,537, Cl. 75-134.00M.
Torrington Company, The: *See*—
Corbo, Kenneth P.; Shepard, Richard W.; Ross, William A.; and Ashmead, Albert S., 4,147,570, Cl. 148-144.000.
Torwegge, Helmut; and Steckstor, Rolf, to Fa. Franz Torwegge. Machine tool for wood, plastics or the like. 4,147,192, Cl. 144-251.00R.

Totten, George E.: *See*—
Williams, Thomas C.; and Totten, George E., 4,147,712, Cl. 260-448.80R.
Tourres, Francois G., to International Glass Equipment Co. Machine for handling containers continuously passing on a moving band and, more particularly, glass bottles. 4,147,249, Cl. 198-459.000.
Tovey, John M., to National Can Corporation. Internal diameter gauge. 4,146,968, Cl. 33-178.00R.
Toyo Kogyo Co., Ltd.: *See*—
Harada, Setsuo, 4,147,143, Cl. 123-119.00A.
Toyokon Kaihatsu Co., Ltd.: *See*—
Kato, Mituyosi, 4,147,449, Cl. 405-154.000.
Toyota Jidosha Kogyo Kabushiki Kaisha: *See*—
Fukuma, Nobuo; Kato, Yoshito; and Nogami, Kouji, 4,147,965, Cl. 318-256.000.
Ito, Masami; Saito, Tsutomu; and Morita, Yoshiyuki, 4,147,148, Cl. 123-179.00L.
Katahira, Eturou; Yamaguchi, Shunzo; Kida, Masashi; and Ishida, Yasuhiko, 4,147,030, Cl. 60-276.000.
Kohama, Tokio; Obayashi, Hideki; Ozaki, Tadashi; and Nohira, Hidetaka, 4,146,986, Cl. 60-290.000.
Nagano, Tetsuro, 4,147,141, Cl. 123-119.00A.
Noguchi, Masamitsu; Komiyama, Yoshiro; and Hashimoto, Masaoki, 4,147,074, Cl. 74-559.000.
Suzuki, Michio; and Shiozawa, Ken, 4,147,032, Cl. 60-290.000.
Yamawaki, Takeshi; and Kume, Hirofumi, 4,147,336, Cl. 267-111.000.
Yokota, Masato; and Katayama, Tetsuji, 4,147,150, Cl. 123-191.00S.
ozune, Toshimasa; and Hanzawa, Hisashi, to Sony Corporation. Recording and/or reproducing apparatus mode control system. 4,147,898, Cl. 179-100.110.
Traulsen, David E. Winding tool for magnetic tape cassettes. 4,147,314, Cl. 242-179.000.
Tridar: *See*—
Miller, Eric M., 4,147,892, Cl. 179-1.0HF.
Trio Kabushiki Kaisha: *See*—
Sakaida, Kaku, 4,147,986, Cl. 325-316.000.
Trip Lite Ltd.: *See*—
Jordan, Kenneth A., 4,147,311, Cl. 242-47.010.
Trizno, Maya S.: *See*—
Pronko, Vladimir G.; Onosovsky, Evgeny V.; Chuvpilo, Albert V.; Zhuravleva, Irina N.; Korneev, Viktor A.; Klimenkov, Dmitry A.; Smirnova, Galina M.; Usanov, Vladimir V.; Ivanov, Jury I.; Chernyshev, Boris A.; Nikitkin, Vasily D.; Nikolaev, Anatoly F.; Trizno, Maya S.; Karkozov, Valery G.; Verkhoglyadova, Tatyana J.; Moskalev, Evgeny V.; and Yakovleva, Lidia I., 4,147,210, Cl. 165-165.000.
Trojan, Paul K.: *See*—
Flinn, Richard A.; and Trojan, Paul K., 4,147,533, Cl. 75-58.000.
TRW Inc.: *See*—
Peterson, James G., 4,147,943, Cl. 307-355.000.
Scribner, Jack B.; Moorman, Edward W.; and Payne, James S., 4,147,071, Cl. 74-409.000.
Tsay, Yuh-Geng: *See*—
Kende, Andrew S.; Mills, John E.; and Tsay, Yuh-Geng, 4,147,706, Cl. 260-365.000.
Tsentralny Nauchno-Issledovatelsky Avtomobilny I Avtomotorny Institut (NAMI): *See*—
Folomin, Anatoly A.; Fesenko, Vsevolod K.; Girutsky, Olgerd I.; and Paukh, Vyacheslav N., 4,147,245, Cl. 192-85.0AA.
Tsuji, Kunihiko: *See*—
Kawakami, Sigezo; Tsuji, Kunihiko; Omura, Hiroshi; and Ishizuka, Hisai, 4,147,505, Cl. 432-118.000.
Tsujiuchi, Junpei; Honda, Toshio; and Okuda, Hiroshi, to Kabushiki Kaisha Daini Seikosha. Hardness tester. 4,147,052, Cl. 73-81.000.
Tsunoi, Haruo: *See*—
Goshima, Yoshitomo; Onoda, Shigeyoshi; Kawakubo, Kazuo; Hoshino, Osamu; Tsunoi, Haruo; and Iida, Noriyoshi, 4,147,501, Cl. 432-60.000.
Tsybulnik, Isaak; and Tsybulnik, Maikl. Shock absorber device. 4,147,319, Cl. 248-582.000.
Tsybulnik, Maikl: *See*—
Tsybulnik, Isaak; and Tsybulnik, Maikl, 4,147,319, Cl. 248-582.000.
Tuck, Richard A., to E M I-Varian Limited. Thermionic electron emitter. 4,147,954, Cl. 313-337.000.
Tuma, Alois V.: *See*—
Harwood, Leopold A.; Groeneweg, Willem H.; and Tuma, Alois V., 4,148,058, Cl. 358-24.000.
Tunick, Allen A.: *See*—
Koff, Fred W.; Tunick, Allen A.; and Sifniades, Stylianos, 4,147,623, Cl. 210-31.00R.
Turcianske Strojarne: *See*—
Rasman, Stefan; Hegedus, Pavol; and Habarda, Pavol, 4,147,075, Cl. 74-720.000.
Turner, Garland L.: *See*—
Lipscomb, Walter P.; McKlveen, John R.; and Turner, Garland L., 4,147,749, Cl. 264-167.000.
Turner, Stephen, to Reckitt & Colman Products Limited. Treatment of hypertension with thiadiazoles. 4,147,794, Cl. 424-270.000.
Tutschek, Ernst: *See*—
Heissenberger, Otto; Syrowatka, Rupert; and Tutschek, Ernst, 4,147,101, Cl. 100-118.000.
Uchida, Shunsuke: *See*—
Utamura, Motoaki; and Uchida, Shunsuke, 4,147,587, Cl. 176-19.0LD.
Uenoyama, Masaru: *See*—
Umeda, Haruhiko; Uenoyama, Masaru; Ishizuki, Kotoshige; and Hara, Hideo, 4,147,262, Cl. 414-687.000.
Uhde, GmbH: *See*—
Korner, Jorg-Peter; Stalzer, Josef; Dornhoff, Gunther; and Kopl, Manfred, 4,147,517, Cl. 422-242.000.
Uhl, Ernst: *See*—
Dettmann, Heinrich; and Uhl, Ernst, 4,147,824, Cl. 428-65.000.
Uhlig, Albert R., to Owens-Illinois, Inc. Fluid product dispenser. 4,147,278, Cl. 222-94.000.
Ulbrich, George: *See*—
Andrews, Daniel M.; Merlina, Joseph F.; Redmond, John P.; Scheingold, William S.; and Ulbrich, George, 4,147,889, Cl. 174-52.0FP.
Ultraseal International Limited: *See*—
Young, Peter D., 4,147,821, Cl. 427-295.000.
Umann, Walter: *See*—
Heckel, Klaus; Klaffke, Friedemann; and Umann, Walter, 4,147,828, Cl. 428-255.000.
Umeda, Haruhiko; Uenoyama, Masaru; Ishizuki, Kotoshige; and Hara, Hideo, to Kabushiki Kaisha Komatsu Seisakusho. Excavating and loading machine mounted on a wheeled type vehicle. 4,147,262, Cl. 414-687.000.
Umezawa, Hamao; Takeuchi, Tomio; Hamada, Masa; Ishizuka, Masaaki; Naganawa, Hiroshi; Oki, Toshikazu; and Inui, Taiji, to Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai. Antibiotic baumycin complex and components thereof. 4,147,778, Cl. 424-181.000.
Umezawa, Hamao; Maeda, Kenji; Kondo, Shinichi; and Umezawa, Sumio, to Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai. 1N-(α-Hydroxy-ω-aminoalkanoyl)-6'N-methyl-3',4'-dideoxykanamycin B and the production thereof. 4,147,861, Cl. 536-10.000.
Umezawa, Iwao; Komiyama, Kanki; and Takeshima, Hideo, to Kitasato Institute, The. Antibiotic sporamycin. 4,147,774, Cl. 424-118.000.
Umezawa, Sumio: *See*—
Umezawa, Hamao; Maeda, Kenji; Kondo, Shinichi; and Umezawa, Sumio, 4,147,861, Cl. 536-10.000.
Underwood, Donald E. Sound pick-up attachment for stringed instrument. 4,147,084, Cl. 84-1.160.
Unger, Eberhart; Jutle, Hans; and Stuckmann, Dieter, to Gewerkschaft Eisenhutte Westfalia. Method of, and apparatus for, driving and lining tunnels. 4,147,453, Cl. 405-141.000.
Unger, Peter J.: *See*—
Mutton, Jon C.; and Unger, Peter J., 4,148,042, Cl. 346-155.000.
Uni-Cardan AG: *See*—
Girguis, Sobhy; Krude, Werner; and Harz, Peter, 4,147,041, Cl. 64-17.00A.
Union Carbide Corporation: *See*—
Williams, Thomas C.; and Totten, George E., 4,147,712, Cl. 260-448.80R.
Union Miniere S.A.: *See*—
Deliege, Jacques; Giot, Michel; Obolensky, Vsevolod; Deconinck, Luc; and Lejeune, Marc, 4,147,390, Cl. 299-8.000.
Union Oil Company of California: *See*—
Sandiford, Burton B., 4,147,211, Cl. 166-270.000.
Union Special Corporation: *See*—
Adamski, Maximilian, Jr.; Talsma, Robert C.; and Walters, Richard E., 4,147,120, Cl. 112-318.000.
Uniroyal, Inc.: *See*—
Mao, Chung-Ling; and Nudenberg, Walter, 4,147,678, Cl 260-28.50R.
United States of America
Air Force: *See*—
Arnold, Fred E.; and Hedberg, Frederick L., 4,147,868, Cl. 544-353.000.
Evers, Robert C., 4,147,858, Cl. 528-210.000.
Leiby, Clare C., Jr., 4,147,995, Cl. 331-94.5PE.
Maier, Roe J., Jr., 4,148,050, Cl. 357-30.000.
Army: *See*—
Hudson, Colin M.; and Andre, William L., 4,146,987, Cl. 42-1.00E.
Larsen, Lawrence E.; and Jacobi, John H., 4,148,005, Cl. 338-28.000.
Energy: *See*—
Heckman, Richard C.; and Moss, Marvin, 4,147,938, Cl. 250-506.000.
Narayan, Jagdish; and Young, Rosa T., 4,147,563, Cl. 148-1.500.
Szekely, Thomas, 4,147,590, Cl. 176-39.000.
National Aeronautics and Space Administration; administrator; with respect to an invention of:
Rook, Charles W. Redundant RF system for space application. 4,147,980, Cl. 325-24.000.
Navy: *See*—
Brooks, John D.; Humason, Harry W.; and Gordon, Frank E., 4,147,124, Cl. 114-321.000.
Haas, George A.; Greene, Richard F.; and Shih, Arnold, 4,147,515, Cl. 23-232.00E.
Kelly, John D.; Hammond, Wayne S.; and Taylor, Gordon A., 4,148,032, Cl. 343-18.00A.
Reeves, Charlie F., 4,147,942, Cl. 307-273.000.
Taylor, Henry F., 4,147,929, Cl. 250-207.000.
Wood, Stanley E.; Moore, Kenneth L.; and Black, William L., 4,147,055, Cl. 73-167.000.
U.S. Philips Corporation: *See*—
Andrich, Ekkehard; and Schlageter, Klaus, 4,147,815, Cl. 427-64.000.
Bosselaar, Cornelis A.; and Foster, Alan, 4,148,053, Cl. 357-38.000.

Browne, Arthur; and Baid, Waheed G., 4,147,930, Cl. 250-223.00R.
Edlinger, Wolfgang F. J.; De Brebisson, Michel; Biet, Jean-Pierre H.; and Decrouen, Jean-Michel, 4,148,055, Cl. 357-44.000.
Hart, Cornelis M.; and Lohstroh, Jan, 4,148,054, Cl. 357-44.000.
Jelmorini, Gerardus, 4,147,917, Cl. 219-121.00P.
Pirotte, Franz L. G., 4,147,927, Cl. 219-541.000.
van Werkhoven, Jan, 4,148,093, Cl. 362-6.000.
Wurscher, Horst; and Brenner, Gerhard, 4,147,341, Cl. 271-122.000.

United States Steel Corporation: *See—*
Winslow, Gerald R., 4,147,379, Cl. 280-781.000.

United Technologies Corporation: *See—*
Drinkuth, William H., 4,147,433, Cl. 356-390.000.

Unitika Limited: *See—*
Akae, Kiyoshi; Kitada, Masaya; and Uno, Yoshiyuki, 4,147,504, Cl. 432-101.000.

University of Iowa Research Foundation: *See—*
Montgomery, Rex; and Chiang, Chao-Kuo, 4,147,691, Cl. 260-112.00R.

University of Utah: *See—*
Giddings, John C., 4,147,621, Cl. 210-22.00C.

Uno, Yoshiyuki: *See—*
Akae, Kiyoshi; Kitada, Masaya; and Uno, Yoshiyuki, 4,147,504, Cl. 432-101.000.

Upjohn Company, The: *See—*
Dolak, Lester A., 4,147,704, Cl. 260-343.450.
Smith, Herman W., 4,147,877, Cl. 560-53.000.
Smith, Herman W., 4,147,879, Cl. 560-121.000.

Usami, Hikoo, to Tomy Kogyo Co., Inc. Simulated ball return toy. 4,147,350, Cl. 273-85.00R.

Usanov, Vladimir V.: *See—*
Pronko, Vladimir G.; Onosovsky, Evgeny V.; Chuvpilo, Albert V.; Zhuravleva, Irina N.; Korneev, Viktor A.; Klimenkov, Dmitry A.; Smirnova, Galina M.; Usanov, Vladimir V.; Ivanov, Jury I.; Chernyshev, Boris A.; Nikitkin, Vasily D.; Nikolaev, Anatoly F.; Trizno, Maya S.; Karkozov, Valery G.; Verkhoglyadova, Tatyana J.; Moskalev, Evgeny V.; and Yakovleva, Lidia I., 4,147,210, Cl. 165-165.000.

USM Corporation: *See—*
Meyer, Engelbert A., 4,147,005, Cl. 52-397.000.
Sillars, Frederick S., 4,147,288, Cl. 228-43.000.

Utamura, Motoaki; and Uchida, Shunsuke, to Hitachi, Ltd. Method for detecting the failure of nuclear fuel elements. 4,147,587, Cl. 176-19.0LD.

Uyeda, Frederick K., to Roper Corporation. Shaped antenna for energy distribution in a microwave cooking cavity. 4,147,912, Cl. 219-10.55F.

Vakuum Vulk Holding Limited: *See—*
Schelkmann, Wilhelm, 4,147,642, Cl. 156-96.000.

Valdespino, Joseph M., to Grassaw, Inc. Rotary mower and blade apparatus. 4,147,018, Cl. 56-295.000.

Valis, Jaroslav: *See—*
Kain, Per; Lockley, Robert; and Valis, Jaroslav, 4,147,966, Cl. 318-327.000.

van der Lely, Ary; and Bom, Cornelis J. G., to C. van der Lely N.V. Cultivating implements. 4,147,117, Cl. 111-52.000.

van der Lely, Cornelis. Standard model tractor with removable second set of operating controls. 4,147,227, Cl. 180-77.00C.

van der Velden, Johannes H., to Boeing Company, The. Coupling sleeve. 4,147,385, Cl. 285-382.400.

van der Vies, Johannes, to Akzona Incorporated. Oral pharmaceutical preparation. 4,147,783, Cl. 424-243.000.

Van Hoeven, William, Jr.: *See—*
Vassiliou, Eustathios; and Van Hoeven, William, Jr., 4,147,683, Cl. 260-29.60F.

van Mil, Martinus P. G., to Stork PMT B.V. Method and apparatus for packing slaughtered birds, including poultry, into an envelope, especially a bag shaped package. 4,147,012, Cl. 53-468.000.

Vano, Gerald L., to Alden Research Foundation. Framing signal generator for electrical recorders. 4,148,075, Cl. 358-267.000.

Vanus, Anthony M.; and Vanus, Jerome W., to Sport Fishing Fineries, Inc. Bait tank. 4,146,989, Cl. 43-55.000.

Vanus, Jerome W.: *See—*
Vanus, Anthony M.; and Vanus, Jerome W., 4,146,989, Cl. 43-55.000.

van Werkhoven, Jan, to U.S. Philips Corporation. Flash array. 4,148,093, Cl. 362-6.000.

Varian Associates, Inc.: *See—*
Mann, Joseph K., 4,147,431, Cl. 356-72.000.

Vassiliou, Eustathios; and Van Hoeven, William, Jr., to Du Pont de Nemours, E. I., and Company. Fluorocarbon polymer-polymeric adjunct coating compositions stabilized against discoloration. 4,147,683, Cl. 260-29.60F.

Vasta, Joseph A., to Du Pont de Nemours, E. I., and Company. Aqueous coating composition of an acrylic-vinyl oxazoline ester polymer. 4,147,674, Cl. 260-17.00R.

Vecchi, John C. Adjustable stock guide. 4,147,082, Cl. 83-440.100.

Vereinigte Flugtechnische Werke-Fokker GmbH: *See—*
Friedrich, Helmut; and Schaper, Jurgen, 4,147,025, Cl. 60-39.060.

Vereinigte Osterreichische Eisen- und Stahlwerke - Alpine Montan Aktiengesellschaft: *See—*
Siebenhofer, Gottfried; Mulner, Manfred; and Arbeithuber, Walter, 4,147,391, Cl. 299-75.000.
Vogl, Ernst; and Kammerhofer, Klaus, 4,147,532, Cl. 75-52.000.

Verkhoglyadova, Tatyana J.: *See—*
Pronko, Vladimir G.; Onosovsky, Evgeny V.; Chuvpilo, Albert V.; Zhuravleva, Irina N.; Korneev, Viktor A.; Klimenkov, Dmitry A.; Smirnova, Galina M.; Usanov, Vladimir V.; Ivanov, Jury I.; Chernyshev, Boris A.; Nikitkin, Vasily D.; Nikolaev, Anatoly F.; Trizno, Maya S.; Karkozov, Valery G.; Verkhoglyadova, Tatyana J.; Moskalev, Evgeny V.; and Yakovleva, Lidia I., 4,147,210, Cl. 165-165.000.

Vernaleken, Hugo: *See—*
Alewelt, Wolfgang; Margotte, Dieter; Vernaleken, Hugo; and Kassahn, Horst-Gunter, 4,147,707, Cl. 260-37.0SB.

Vianova Kunstharz, A.G.: *See—*
Pampouchidis, Georgios, 4,147,676, Cl. 260-23.0TN.

Victor United, Inc.: *See—*
Fischer, Earl L.; and Garmon, Lee F., Jr., 4,147,152, Cl. 124-76.000.

Victory Games, Inc.: *See—*
Angove, Donald A., 4,147,347, Cl. 273-57.000.

Vidales, Federico E.: *See—*
Ortiz, Francisco E.; and Vidales, Federico E., 4,147,147, Cl. 123-148.0DS.

Vince, Albert F.: *See—*
Southern, Raymond L.; Benford, James G.; Petarra, Steve; Holbein, Robert D.; and Vince, Albert F., 4,147,506, Cl. 432-148.000.

Vock, Manfred H.: *See—*
Sprecker, Mark A.; Vock, Manfred H.; Schmitt, Frederick L.; Hall, John B.; and Sanders, James M., 4,147,727, Cl. 260-586.00R.

Vockenhuber, Karl, to Vockenhuber, Karl; and Hauser, Raimund. Camera system including a still or motion picture camera and a TV camera. 4,148,072, Cl. 358-224.000.

Vodakov, Jury A.; and Mokhov, Evgeny N. Method for epitaxial production of semiconductor silicon carbide utilizing a close-space sublimation deposition technique. 4,147,572, Cl. 148-175.000.

Vogl, Ernst; and Kammerhofer, Klaus, to Vereinigte Osterreichische Eisen- und Stahlwerke - Alpine Montan Aktiengesellschaft. Process for piloting or controlling a steel refining process. 4,147,532, Cl. 75-52.000.

Vogt, Alfred; and Kunkel, Wolfgang, to Interliz Anstalt. Boiler having a hot gas generator for burning liquid or gaseous fuels. 4,147,134, Cl. 122-5.000.

Vogt, B. Richard: *See—*
Wade, Peter C.; and Vogt, B. Richard, 4,147,698, Cl. 260-301.000.

Vogt, Wilhelm: *See—*
Blumenfeld, Georg; Petersen, Egon N.; Richtzenhain, Hermann; Vogt, Wilhelm; and Vollkommer, Norbert, 4,147,881, Cl. 560-221.000.

Volkert, John K.: *See—*
Penick, Ib; and Volkert, John K., 4,146,983, Cl. 40-124.100.

Volkswagenwerk Aktiengesellschaft: *See—*
Domland, Christoph; and Lotzmann, Manfred, 4,147,145, Cl. 123-148.00E.

Vollkommer, Norbert: *See—*
Blumenfeld, Georg; Petersen, Egon N.; Richtzenhain, Hermann; Vogt, Wilhelm; and Vollkommer, Norbert, 4,147,881, Cl. 560-221.000.

Vollman, Leonard L., to Thermal Engineering Company. Apparatus for stimulating removal of electrolytic energy from fluids. 4,147,607, Cl. 204-196.000.

von Schenck, Raban: *See—*
Adrian, Renate; von Schenck, Raban; Cox, Bernd; and Wirtz, Peter, 4,147,758, Cl. 423-315.000.

Vork, William D., to Graco Inc. Secondary pump feed apparatus. 4,147,478, Cl. 417-458.000.

Vought Corporation: *See—*
Bard, Donald O., 4,147,066, Cl. 74-5.100.

Vroom, David, to Duval Corporation. Hydroset pressure relief system. 4,147,309, Cl. 241-215.000.

Vyskumny ustav papieru a celulosy of Bratislava: *See—*
Balcar, Cestmir; Kostka, Antonin; Havranek, Jaroslav; and Lalak, Marcel, 4,147,616, Cl. 209-12.000.

W. R. Grace & Co.: *See—*
Calton, Gary J.; Espenshade, Marlin A.; and Ranieri, Richard L., 4,147,798, Cl. 424-279.000.

Wachter, Erich, to Sulzer Brothers Limited. Connecting piece for a branch duct to a substantially round air conditioning duct. 4,147,382, Cl. 285-189.000.

Wacker-Chemie GmbH: *See—*
Kratel, Gunter; Stohr, Gunter; Eberle, Ludwig; and Muhlhofer, Ernst, 4,147,760, Cl. 423-336.000.
Schiller, August; Dorsch, Norman; and Sommer, Owsin, 4,147,855, Cl. 528-23.000.

Waddill, Harold G.; and Schulze, Heinz, to Texaco Development Corp. Epoxy cure with polyamine-polyether succinimide systems. 4,147,857, Cl. 528-94.000.

Wade, Peter C.; and Vogt, B. Richard, to E. R. Squibb & Sons, Inc. 3-(Heterocyclicalkylamino)benzisothiazole-1,1-dioxides. 4,147,698, Cl. 260-301.000.

Wagner, Kuno: *See—*
Hetzel, Hartmut; Konig, Klaus; Schmelzer, Hans G.; and Wagner, Kuno, 4,147,714, Cl. 260-453.0AB.

Walker, Gentle J., to Harvey, Paul C. Elevated aquarium tank. 4,147,131, Cl. 119-5.000.

Wallace, William K., to Chicago Pneumatic Tool Company. Two-speed offset nutrunner. 4,147,219, Cl. 173-12.000.

Walser, Armin; Fryer, Rodney I.; and Benjamin, Louis, to Hoffmann-La Roche Inc. Imidazo[1,5-α][1,4]benzodiazepines. 4,147,875, Cl. 548-302.000.

Walsh, Fraser M.; Crouse, Dennis N.; and Ajami, Alfred M., to Eco-Control, Inc. Halogen complexing homotetra-alkyl salts for use in halogen cells. 4,147,840, Cl. 429-50.000.

Walter, Dennis P. Shotgun target mold for ice targets. 4,147,324, Cl. 249-170.000.
Walter, Henry J.; and Kunz, Raymond W., to Clairol Inc. Heat treating articles. 4,147,921, Cl. 219-211.000.
Walters, Richard E.: *See—*
Adamski, Maximilian, Jr.; Talsma, Robert C.; and Walters, Richard E., 4,147,120, Cl. 112-318.000.
Wang, Richard H. S.: *See—*
Thompson, John W.; and Wang, Richard H. S., 4,147,689, Cl. 260-45.9NC.
Wang, Robert O. Device for testing and calibrating moisture measuring instrument. 4,147,976, Cl. 324-61.00R.
Wang, Samuel S.; Smith, Eugene L., Jr.; and Huliganga, Ernie F., to American Cyanamid Company. Collector combination for non-sulfide ores. 4,147,644, Cl. 252-61.000.
Ward, William J., III, to General Electric Company. System for selective removal of hydrogen sulfide from a mixture of gases. 4,147,754, Cl. 423-224.000.
Ward, William P.: *See—*
Lauffer, Donald K.; and Ward, William P., 4,148,099, Cl. 365-226.000.
Warenius, Robert E.: *See—*
Aranow, Harold B.; Gyuraki, Joseph P.; and Warenius, Robert E., 4,147,160, Cl. 128-2.00S.
Warner, Harlow L.: *See—*
McNulty, Patrick J.; and Warner, Harlow L., 4,147,528, Cl. 71-92.000.
Warner-Lambert Company: *See—*
Chen, Evan N.; Beddall, Edward A.; and Goddard, Bryan J., 4,146,958, Cl. 30-47.000.
Warren, William E., to Bespak Industries Limited. Pump assembly for an atomizing piston pump. 4,147,476, Cl. 417-328.000.
Warrikhoff, Harald F. H. Method and apparatus for producing a radiological image of an object. 4,147,935, Cl. 250-416.0TV.
Warsinski, Robert G.; and Wlodyga, George R., to Ford Motor Company. Method and apparatus for eliminating entrapped gas in die castings. 4,147,200, Cl. 164-4.000.
Washida, Nobuo. Method and an apparatus for driving sheet piles into the ground. 4,147,457, Cl. 405-232.000.
Wassmer, Norman B.; Anderson, Franklyn G.; and Hodges, Joseph L., to Ore-Ida Foods, Inc. Electronic sorting apparatus. 4,147,619, Cl. 209-565.000.
Watanabe, Masakatsu, to Hochiki Corporation. Alarm system utilizing bidirectional wired television system. 4,148,021, Cl. 340-531.000.
Watanabe, Yoshimi, to Sony Corporation. Reproducing system having scanning transducer means which are selectively deflectable to avoid tracking errors. 4,148,083, Cl. 360-77.000.
Watanabe, Yoshio; and Saburi, Akio, to Nippon Telegraph & Telephone Public Corp.; and Nippon Electric Co., Ltd. Time division multiplex communication device comprising a switching matrix between C/E buffers and control circuits. 4,147,894, Cl. 179-15.00A.
Waterkamp, Peter: *See—*
Bangert, Hans; and Waterkamp, Peter, 4,147,375, Cl. 280-483.000.
Watry, C. Nicholas. Precast panel building construction. 4,147,009, Cl. 52-744.000.
Watson, Wayne C.; and Weisel, Jonas W., to American Olean Tile Company, Inc. Hole cutter for hard materials such as ceramic tile. 4,147,464, Cl. 408-206.000.
Webb, Edward A.; Makar, Francis B., Jr.; and Barakitis, Nikolaos, to GTE Sylvania Incorporated. Method of sealing alumina arc tube. 4,147,952, Cl. 313-220.000.
Webb, Roy E. G. Coin handling apparatus. 4,147,175, Cl. 133-3.00D.
Weber, Harold J. Frequency dependent amplitude modulated translator apparatus. 4,147,973, Cl. 324-3.000.
Weeks, Paul D.: *See—*
Brennan, Thomas M.; Brannegan, Daniel P.; Weeks, Paul D.; and Kuhla, Donald E., 4,147,705, Cl. 260-345.90R.
Wegener, Willi A., to Envirotech Corporation. Deflector blade for rotary drum filter. 4,147,634, Cl. 210-396.000.
Weidler, Erhard A. Chain net. 4,147,023, Cl. 59-86.000.
Weiler, Rolf: *See—*
Steffen, Hermann; and Weiler, Rolf, 4,147,236, Cl. 188-1.00A.
Weiler, Wolfgang, to Motoren-und Turbinen-Union Munich GmbH. Gas turbine engine. 4,147,026, Cl. 60-39.080.
Weiner, Milton L.: *See—*
Breidt, Peter, Jr.; Higgins, Thomas W.; Nahmias, A. Michael; and Weiner, Milton L., 4,147,827, Cl. 428-218.000.
Weingarten, Joseph L. Load distributive cargo platform system. 4,147,111, Cl. 105-463.000.
Weirather, Robert R.: *See—*
Smiley, Charles F.; and Weirather, Robert R., 4,148,069, Cl. 358-160.000.
Weisel, Jonas W.: *See—*
Watson, Wayne C.; and Weisel, Jonas W., 4,147,464, Cl. 408-206.000.
Welch Allyn, Inc.: *See—*
Newman, Richard W.; and Connors, John D., 4,147,163, Cl. 128-9.000.
Welden, David P. Concrete forming and curing apparatus. 4,147,323, Cl. 249-79.000.
Wertheimer, Donald J.; and Holmes, Ralph A. Grooved grill cleaner. 4,146,943, Cl. 15-111.000.
Werts, David A. Fuel oil storage tank. 4,147,269, Cl. 220-1.00B.
Wessel, Wolf; and Ripper, Wolfgang, to Robert Bosch GmbH. Fuel supply system. 4,147,146, Cl. 123-139.0AW.
West Electric Company, Ltd.: *See—*
Iwata, Hiroshi; and Yamaoka, Tetsuo, 4,147,420, Cl. 354-127.000.
Wester, Douglas J.; and Martin, Robert D., to Avco Corporation. Thermocouple reference junction calibrator. 4,147,061, Cl. 73-341.000.
Western Electric Co., Inc.: *See—*
Spainhour, Carroll D., 4,147,405, Cl. 350-96.210.
Westfalia Separator AG: *See—*
Hemfort, Heinrich, 4,147,293, Cl. 233-7.000.
Westinghouse Electric Corp.: *See—*
Benbow, Eugene C.; and Adams, Rodney V., 4,147,983, Cl. 324-103.00R.
Beydler, William W.; and Helland, Arden R., 4,147,940, Cl. 307-205.000.
Cricchi, James R.; Blaha, Franklyn C.; and Fitzpatrick, Michael D., 4,148,049, Cl. 357-23.000.
Eley, Edgar R., 4,147,999, Cl. 335-35.000.
Elms, Robert T., 4,147,961, Cl. 315-291.000.
Engel, Joseph C., 4,147,962, Cl. 315-291.000.
Garbuny, Max; and Phillips, D. Colin, 4,147,602, Cl. 204-157.10R.
Gelzheiser, Francis L., 4,148,004, Cl. 337-82.000.
Hoeh, Frederick W., deceased, 4,147,947, Cl. 313-27.000.
Kuhn, Edmund W.; and Bennett, Allan I., 4,148,024, Cl. 340-638.000.
Nathanson, Harvey C.; and Thomas, Richard N., 4,148,052, Cl. 357-30.000.
Quesinberry, Elmen C., 4,148,029, Cl. 343-9.000.
Roman, Walter G.; and Sutton, Harry G., Jr., 4,147,589, Cl. 176-36.00C.
Westra, Dan P.; and Siewert, John, to Challenge Machinery Company, The. Paper padding or tableting press. 4,146,942, Cl. 11-1.00B.
Wevers, Jean: *See—*
Arnau, Jose L.; Barrat, Christian R.; and Wevers, Jean, 4,147,649, Cl. 252-89.00R.
Wharton Shipping Corporation: *See—*
Kirby, William E.; and Seymour, David J., 4,147,123, Cl. 114-260.000.
Whitefield, J. Thomas: *See—*
Woron, Robert P.; Whitefield, J. Thomas; and Roth, Steven R., 4,147,083, Cl. 84-1.010.
Whitehead, James S.: *See—*
Harvey, Samuel E.; Whitehead, James S.; and Goranson, Paul L., 4,147,264, Cl. 414-411.000.
Whiteside, George D.; and Laskin, Irving, to Polaroid Corporation. Photographic exposure control system with independent ambient and artificial illumination control modes. 4,147,418, Cl. 354-27.000.
Whiting Corporation: *See—*
Ames, Victor H.; and Hartelius, Marshall V., 4,147,238, Cl. 188-57.000.
Whittaker, Charles B., Jr., to NL Industries, Inc. Drill screw. 4,147,088, Cl. 85-41.000.
Wide, Lars: *See—*
Carlsson, Erik; Pejchal, Karel; Fritzon, Hans G.; Hagstrom, Staffan; Kerff, Anton; and Wide, Lars, 4,147,187, Cl. 139-196.200.
Wieder, Harold: *See—*
Chevallier, Jacques P.; Guarnieri, Charles R.; Onton, Aare; and Wieder, Harold, 4,147,667, Cl. 252-501.000.
Wiederkehr, Hermann, to Hoffmann-La Roche Inc. Process for the preparation of ethynyl-β-ionol. 4,147,886, Cl. 568-824.000.
Wilcox, Merrill. N-benzyl-2,6-dinitro-3-amino-4-trifluoromethylanilines as herbicides. 4,147,529, Cl. 71-121.000.
Wildman, John R.: *See—*
Barlow, Gordon A.; Licitis, Gunars; and Wildman, John R., 4,147,355, Cl. 273-101.100.
Wiley, Philip A.: *See—*
Richardson, Carl; and Wiley, Philip A., 4,147,618, Cl. 209-589.000.
Wilhelm, James H.: *See—*
Dahlstrom, Donald A.; Ellison, William; and Wilhelm, James H., 4,147,756, Cl. 423-242.000.
Wilkinson, Ronald A.: *See—*
Little, Allan V., deceased; Little, Anna, administratrix; and Wilkinson, Ronald A., 4,147,142, Cl. 123-133.000.
Willhalm, Bruno: *See—*
Schulte-Elte, Karl-Heinrich; Willhalm, Bruno; and Gautschi, Fritz, 4,147,672, Cl. 252-522.000.
William H. Rorer, Inc.: *See—*
Diamond, Julius; and Douglas, George H., 4,147,804, Cl. 424-322.000.
Klein, Robert W.; and Foxx, Mary E., 4,147,782, Cl. 424-230.000.
Williams, Bruce T. Electrostatic voltmeter probe positioned on the outside of a housing and vibrator by a piezoelectric transducer within the housing. 4,147,981, Cl. 324-32.000.
Williams, Clarence E. Door having improved closing and latching systems. 4,146,994, Cl. 49-367.000.
Williams, Thomas C.; and Totten, George E., to Union Carbide Corporation. Amino substituted mercapto organosilicon compounds. 4,147,712, Cl. 260-448.80R.
Willums, Jan-Olaf, to Nor-Am Resources Technology Incorporated. Method of and apparatus for construction of pipes for marine use, as for ocean mining and the like. 4,147,454, Cl. 405-156.000.
Wilson, Charles A., to Dow Chemical Company, The. 4,5-Dihydro-4-oxo-1,3-dithiolo(4,5-D)pyridazine-2-ylidene-propanedinitriles. 4,147,784, Cl. 424-250.000.
Wilson, William R.: *See—*
Caudel, Edward R.; Wilson, William R.; and Merrow, Thomas E., 4,147,984, Cl. 325-25.000.

Windheuser, John J.: *See*—
Shaffer, Richard D.; and Windheuser, John J., 4,147,768, Cl. 424-35.000.
Wing, Raymond C.: *See*—
DeHart, Kenneth L.; and Wing, Raymond C., 4,147,518, Cl. 44-13.000.
Winiasz, Michael E.: *See*—
McGill, Robert W.; and Winiasz, Michael E., 4,147,265, Cl. 414-416.000.
Winslow, Gerald R., to United States Steel Corporation. Vehicle frame. 4,147,379, Cl. 280-781.000.
Winter, Joseph; Shapiro, Eugene; and Smith, Warren F., to Olin Corporation. Method for the production of multiple gauge strip by draw shaving. 4,147,089, Cl. 90-24.00R.
Winter, Joseph; Shapiro, Eugene; and Smith, Warren F., to Olin Corporation. Apparatus for supporting a shaving tool in an adjustable tool holder for multiple gauge strip draw shaving. 4,147,090, Cl. 90-24.00R.
Wintgens, James C.: *See*—
Cohen, Eleanor B.; Stassen, William N.; and Wintgens, James C., 4,147,555, Cl. 106-99.000.
Winzer, Gerhard: *See*—
Baues, Peter; Mahlein, Hans; Moeckel, Peter; Reichelt, Achim; and Winzer, Gerhard, 4,147,979, Cl. 324-244.000.
Wippermann, Gerhard. Apparatus for the dosed dispensing of free-flowing media. 4,147,189, Cl. 141-18.000.
Wirth, Hermann O.: *See*—
Michaelis, Klaus P.; and Wirth, Hermann O., 4,147,666, Cl. 252-48.200.
Wirth, Jon C., to Heath Engineering Company. Programmed pressure regulator for controlling the supply of gas pressure to a load device. 4,147,333, Cl. 266-48.000.
Wirtz, Peter: *See*—
Adrian, Renate; von Schenck, Raban; Cox, Bernd; and Wirtz, Peter, 4,147,758, Cl. 423-315.000.
Witte, Johan F., to Stork Amsterdam B.V. Apparatus for continuous treatment of material. 4,147,098, Cl. 99-477.000.
Witthandt, Helge, to Dr. Ing. Rudolf Hell, GmbH. Method and apparatus for electronically retouching. 4,148,009, Cl. 340-146.30H.
Witucki, Edward F.: *See*—
Frankel, Milton B.; Raniere, Frederick D.; Thompson, Wallace W.; Witucki, Edward F.; and Woolery, Dean O., II, 4,147,731, Cl. 260-644.000.
Wlodyga, George R.: *See*—
Warsinski, Robert G.; and Wlodyga, George R., 4,147,200, Cl. 164-4.000.
Wobben, Hendrik J.: *See*—
Boelens, Harmannus; and Wobben, Hendrik J., 4,147,671, Cl. 252-522.000.
Wojtowicz, John A.; and Klanica, Andrew J., to Olin Corporation. Hypochlorous acid process using sweep reactor. 4,147,761, Cl. 423-473.000.
Wolf, Roger P.: *See*—
Smith, Wayne L.; and Wolf, Roger P., 4,147,524, Cl. 55-521.000.
Wood, Marsha L. B., heir: *See*—
Bailey, Kenneth M., deceased; Raymond, Alyce B., heir; Bailey, Bruce K., heir; McElreath, Kay E. B., heir; and Wood, Marsha L. B., heir, 4,147,360, Cl. 273-261.000.
Wood, Marsha Lou Bailey: *See*—
Bailey, Kenneth M., deceased; Raymond, Alyce B., heir; Bailey, Bruce K., heir; McElreath, Kay E. B., heir; and Wood, Marsha L. B., heir, 4,147,360, Cl. 273-261.000.
Wood, Stanley E.; Moore, Kenneth L.; and Black, William L., to United States of America, Navy. Apparatus for determining projectile position and barrel pressure characteristics. 4,147,055, Cl. 73-167.000.
Woodcock, Floyd B.: *See*—
Patten, Hudson T.; and Woodcock, Floyd B., 4,147,222, Cl. 175-9.000.
Woods, David R.: *See*—
Jayne, Gerald J. J.; Woods, David R.; and O'Brien, Joseph P., 4,147,640, Cl. 252-45.000.
Woodstream Corporation: *See*—
Conibear, Frank, 4,146,990, Cl. 43-88.000.
Woodward, Robert B.; and Bickel, Hans, to Ciba-Geigy Corporation. Process for the manufacture of 7β-amino-3-cephem-3-ol-4 carboxylic acid compounds. 4,147,864, Cl. 544-16.000.
Woolery, Dean O., II: *See*—
Frankel, Milton B.; Raniere, Frederick D.; Thompson, Wallace W.; Witucki, Edward F.; and Woolery, Dean O., II, 4,147,731, Cl. 260-644.000.
Woollard, Gary A.; and Smirl, Richard L., to Borg-Warner Corporation. Drive system. 4,147,068, Cl. 74-230.17E.
Wootton, Gordon, to Beecham Group Limited. 1-(3-Hydroxyalk-1-yl)-5-(carboxyalkyl)hydantoin derivatives. 4,147,796, Cl. 424-273.00R.
Woron, Robert P.; Whitefield, J. Thomas; and Roth, Steven R., to Allen Organ Company. Programmable voice characteristic memory system. 4,147,083, Cl. 84-1.010.
Worrell, J. Robert; and Berman, Mark Y., to Standard Oil Company (Indiana). Scissor well template. 4,147,036, Cl. 405-205.000.
Worst, Joseph C., to General Electric Company. Laundry machine improved water temperature control and method. 4,147,297, Cl. 236-12.00A.
Worthington, Paul A.: *See*—
Shephard, Margaret C.; and Worthington, Paul A., 4,147,793, Cl. 424-269.000.
Woythal, Gilbert S.: *See*—
Zernov, Peter; Young, Raymond E.; and Woythal, Gilbert S., 4,147,104, Cl. 101-181.000.
Wright, George L. Engine malfunction protection. 4,147,151, Cl. 123-198.0DC.
Wright, Richard B.; and Konieczynski, Ronald D., to Wright Tool and Forge Company, The. Reversing-ratchet socket wrench. 4,147,076, Cl. 81-63.200.
Wright Tool and Forge Company, The: *See*—
Wright, Richard B.; and Konieczynski, Ronald D., 4,147,076, Cl. 81-63.200.
Wu, Yulin, to Phillips Petroleum Company. Acid-catalyzed hydrolysis of organic hydroperoxide employing a polar solvent and phenol as reaction medium. 4,147,726, Cl. 260-586.00R.
Wurscher, Horst; and Brenner, Gerhard, to U.S. Philips Corporation. Card feeder device. 4,147,341, Cl. 271-122.000.
Württembergische Metallwarenfabrik: *See*—
Ritter, Rolf; and Riegert, Hermann, 4,147,918, Cl. 219-121.0EM.
Wydeen, Russell D.: *See*—
Brook, Richard L.; Gaske, Joseph E.; Kearney, Thomas E.; and Wydeen, Russell D., 4,147,253, Cl. 206-205.000.
Xerox Corporation: *See*—
Crean, Peter A.; and Lavallee, Pierre A., 4,147,928, Cl. 235-454.000.
Lindblad, Nero R.; Johnson, Gordon E.; and Sharp, James H., 4,147,541, Cl. 96-1.500.
Lu, Chin H., 4,147,645, Cl. 252-62.10P.
Mammino, Joseph; and Jossel, Franklin, 4,147,540, Cl. 96-1.200.
McCreight, Edward M.; and Thacker, Charles P., 4,148,098, Cl. 364-200.000.
Naramore, Raymond A., 4,147,342, Cl. 271-221.000.
Xonics, Inc.: *See*—
Lewis, John H., 4,147,932, Cl. 250-330.000.
Yada, Akira; Iijima, Isamu; Itakura, Jo; and Fujikura, Saburo, to Toagosei Chemical Industry Co., Ltd.; and Osakagodo Company Ltd. Additive composition for use in papermaking. 4,147,682, Cl. 260-29.6SQ.
Yajima, Seishi; Kayano, Hideo; Asada, Chiaki; and Saito, Makoto, to Research Institute for Iron, Steel and other Metals of the Tohoku University, The. Cobalt or cobalt alloy composite materials reinforced with continuous silicon carbide fibers and a method for producing the same. 4,147,538, Cl. 75-229.000.
Yakovleva, Lidia I.: *See*—
Pronko, Vladimir G.; Onosovsky, Evgeny V.; Chuvpilo, Albert V.; Zhuravleva, Irina N.; Korneev, Viktor A.; Klimenkov, Dmitry A.; Smirnova, Galina M.; Usanov, Vladimir V.; Ivanov, Jury I.; Chernyshev, Boris A.; Nikitkin, Vasily D.; Nikolaev, Anatoly F.; Trizno, Maya S.; Karkozov, Valery G.; Verkhoglyadova, Tatyana J.; Moskalev, Evgeny V.; and Yakovleva, Lidia I., 4,147,210, Cl. 165-165.000.
Yamaguchi, Hisakichi, to Daiwa Can Company, Limited. Drawn and ironed can body and filled drawn and ironed can for containing pressurized beverages. 4,147,271, Cl. 220-70.000.
Yamaguchi, Shunzo: *See*—
Katahira, Eturou; Yamaguchi, Shunzo; Kida, Masashi; and Ishida, Yasuhiko, 4,147,030, Cl. 60-276.000.
Yamanouchi, Haruo: *See*—
Arakawa, Masatoshi; Yamanouchi, Haruo; Okumura, Taro; and Yoshida, Teruo, 4,147,848, Cl. 526-77.000.
Yamaoka, Tetsuo: *See*—
Iwata, Hiroshi; and Yamaoka, Tetsuo, 4,147,420, Cl. 354-127.000.
Yamauchi, Kiaki; Morimoto, Yukihiko; Sasaki, Toshikatu; and Nakai, Katsumi, to Osaka Gas Company, Ltd. Method for reactivation of platinum group metal catalyst with aqueous alkaline and/or reducing solutions. 4,147,660, Cl. 252-412.000.
Yamauchi, Mineo; and Sumi, Akira, to Yokogawa Electric Works, Ltd. Two-color electrostatic printing apparatus. 4,148,043, Cl. 346-157.000.
Yamawaki, Masao; Aoki, Katsuo; Oka, Yoshio; Suzuki, Takao; Amano, Masahiko; Ozaki, Hideki; and Ishihara, Osamu, to Nippondenso Co., Ltd. Apparatus for thermal diffusion by high frequency induction heating of semiconductor substrates. 4,147,432, Cl. 118-49.100.
Yamawaki, Takeshi; and Kume, Hirofumi, to Toyota Jidosha Kogyo Kabushiki Kaisha. Seat frame for a vehicle. 4,147,336, Cl. 267-111.000.
Yanagi, Hideki: *See*—
Bai, Yasuo; Yanagi, Hideki; Yoshikawa, Junichi; and Ogino, Shigeo, 4,147,592, Cl. 195-66.00B.
Yanagisawa, Isao: *See*—
Shimizu, Noboru; Yanagisawa, Isao; Takata, Masahiro; and Sato, Takahisa, 4,147,885, Cl. 562-535.000.
Yang, Kei-Hsiung, to General Electric Company. Apparatus for X-ray radiography. 4,147,948, Cl. 313-101.000.
Yang, Kei-Hsiung, to General Electric Company. Apparatus for X-ray radiography. 4,147,949, Cl. 313-101.000.
Yao, Shi-Kay: *See*—
Young, Eddie H. C., Jr.; and Yao, Shi-Kay, 4,146,955, Cl. 29-594.000.
Yao, Yoshiaki: *See*—
Aoyagi, Masaya; Hayashi, Mikio; Yoshida, Yasuyuki; and Yao, Yoshiaki, 4,146,936, Cl. 3-1.910.
Yapel, Anthony F., Jr., to Minnesota Mining and Manufacturing Company. Albumin medicament carrier system. 4,147,767, Cl. 424-22.000.
Yashiro, Takahiro: *See*—
Tashiro, Yasunori; Yashiro, Takahiro; and Higuchi, Katsuaki, 4,147,014, Cl. 53-559.000.

Yasukawa, Shozo; and Matsuda, Kenji, to Ishikawajima-Harima Jukogyo Kabushiki Kaisha. Electric smelting furnace. 4,147,887, Cl. 13-18.00B.

Yatsurugi, Yoshifumi; Yusa, Atsushi; and Takahashi, Nagao, to Kabushiki Kaisha Komatsu Seisakusho. Method of manufacturing high-purity silicon rods having a uniform sectional shape. 4,147,814, Cl. 472-51.000.

Yokogawa Electric Works, Ltd.: *See*—
Yamauchi, Mineo; and Sumi, Akira, 4,148,043, Cl. 346-157.000.

Yokota, Masato; and Katayama, Tetsuji, to Toyota Jidosha Kogyo Kabushiki Kaisha. Internal combustion engine with an auxiliary combustion chamber. 4,147,150, Cl. 123-191.00S.

Yokoyama, Shoichiro: *See*—
Ikari, Yoshikatsu; Yokoyama, Shoichiro; Itaya, Ryutaro; and Ohkuma, Tsuneo, 4,147,665, Cl. 252-463.000.

Yoshida, Akio: *See*—
Tanaka, Akira; Nakatani, Mamoru; and Yoshida, Akio, 4,147,554, Cl. 96-130.000.

Yoshida, Hirokazu: *See*—
Kiuchi, Mitsuyuki; Mizukawa, Takumi; Amagami, Keizo; and Yoshida, Hirokazu, 4,147,910, Cl. 219-10.49R.

Yoshida, Jyun-Ichiro: *See*—
Shohata, Nobuaki; Ohno, Tomeji; Ikeda, Shigeru; Fukushima, Takaki; Igarashi, Ryuji; and Yoshida, Jyun-Ichiro, 4,147,670, Cl. 252-519.000.

Yoshida, Teruo: *See*—
Arakawa, Masatoshi; Yamanouchi, Haruo; Okumura, Taro; and Yoshida, Teruo, 4,147,848, Cl. 526-77.000.

Yoshida, Yasuyuki: *See*—
Aoyagi, Masaya; Hayashi, Mikio; Yoshida, Yasuyuki; and Yao, Yoshiaki, 4,146,936, Cl. 3-1.910.

Yoshikawa, Junichi: *See*—
Bai, Yasuo; Yanagi, Hideki; Yoshikawa, Junichi; and Ogino, Shigeo, 4,147,592, Cl. 195-66.00B.

Yoshikawa, Kazuo: *See*—
Andoh, Shizuo; and Yoshikawa, Kazuo, 4,147,960, Cl. 340-769.000.

Yoshimine, Masao: *See*—
Freedman, Harold H.; McGregor, Stanley D.; Yoshimine, Masao; and Kroposki, Lorraine M., 4,147,866, Cl. 544-243.000.

Youla, Jean: *See*—
Henry, Thomas; and Youla, Jean, 4,147,235, Cl. 187-29.00R.

Young, Eddie H. C., Jr.; and Yao, Shi-Kay, to Harris Corporation. Method of fabricating a stepped-array acousto-optic beam deflector. 4,146,955, Cl. 29-594.000.

Young, Frank S.: *See*—
Rabinowitz, Mario; and Young, Frank S., 4,147,890, Cl. 174-127.000.

Young, Peter D., to Ultraseal International Limited. Impregnation of porous articles. 4,147,821, Cl. 427-295.000.

Young, Raymond E.: *See*—
Zernov, Peter; Young, Raymond E.; and Woythal, Gilbert S., 4,147,104, Cl. 101-181.000.

Young, Rosa T.: *See*—
Narayan, Jagdish; and Young, Rosa T., 4,147,563, Cl. 148-1.500.

Ytter, Willy, to Extraversion, Inc. Portable display system. 4,147,198, Cl. 160-135.000.

Yusa, Atsushi: *See*—
Yatsurugi, Yoshifumi; Yusa, Atsushi; and Takahashi, Nagao, 4,147,814, Cl. 472-51.000.

Zaboronok, Georgy F.: *See*—
Sokolov, Boris G.; and Zaboronok, Georgy F., 4,147,915, Cl. 219-121.0EB.

Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai: *See*—
Umezawa, Hamao; Takeuchi, Tomio; Hamada, Masa; Ishizuka, Masaaki; Naganawa, Hiroshi; Oki, Toshikazu; and Inui, Taiji, 4,147,778, Cl. 424-181.000.
Umezawa, Hamao; Maeda, Kenji; Kondo, Shinichi; and Umezawa, Sumio, 4,147,861, Cl. 536-10.000.

Zaitseva, Maria A.: *See*—
Gorodissky, Leonid G.; Evtikhovich, Stanislav M.; Grigoriev, Igor P.; Kvashnin, Nikolai A.; Sokolov, Vladislav I.; Chekreneva, Larisa S.; Birdus, Rostislav G.; Zaitseva, Maria A.; Kryazhev, Jury T.; Kuzminova, Galina V.; and Romanov, Nikolai T., deceased, 4,147,366, Cl. 277-22.000.

Zakhariya, Ramiz H. Self-supporting active solar energy system. 4,147,157, Cl. 126-271.000.

Zakharov, Anatoly A.: *See*—
Bystrov, Nikolai M.; Simonov, Anatoly N.; Levin, Alexandr B.; Meshkov, Jury K.; Zakharov, Anatoly A.; and Kolbanev, Alexei V., 4,147,527, Cl. 65-183.000.

Zambiasi, Franco, to Tecno-Planning Italia Di Giulini e Zambiasi. Modular panel that can be assembled with other similar panels, whereby to form magnetic boards for programming and statistical purposes. 4,146,976, Cl. 35-24.00R.

Zann, Annie: *See*—
Dubois, Jean-Claude; Nguyen, Huu T.; and Zann, Annie, 4,147,655, Cl. 252-299.000.

Zasio, John J.: *See*—
Buelow, Fred K.; Zasio, John J.; and Cooke, Laurence H., 4,147,937, Cl. 250-492.00A.

Zboril, Josef, to BBC Brown, Boveri & Company Limited. Arrangement for maintaining optimum minimum operating clearance between rotor and stator components of fluid-flow machines and the like. 4,147,466, Cl. 415-174.000.

Zbriger, Richard A.: *See*—
Baump, Paul A.; Lyu, Don; Sain, Jerry T.; and Zbriger, Richard A., 4,148,012, Cl. 340-149.00A.

Zeiders, Robert H., to Allis-Chalmers Corporation. Apparatus for valve installation in a flume. 4,147,451, Cl. 405-90.000.

Zenda, Richard J.: *See*—
Malacheski, Joseph J.; and Zenda, Richard J., 4,147,273, Cl. 220-204.000.

Zenith Radio Corporation: *See*—
Hofmann, Judson A., 4,148,068, Cl. 358-153.000.

Zerand Corporation: *See*—
Zernov, Peter; Young, Raymond E.; and Woythal, Gilbert S., 4,147,104, Cl. 101-181.000.

Zernov, Peter; Young, Raymond E.; and Woythal, Gilbert S., to Zerand Corporation. Key color control system for printing press. 4,147,104, Cl. 101-181.000.

Zhuravleva, Irina N.: *See*—
Pronko, Vladimir G.; Onosovsky, Evgeny V.; Chuvpilo, Albert V.; Zhuravleva, Irina N.; Korneev, Viktor A.; Klimenkov, Dmitry A.; Smirnova, Galina M.; Usanov, Vladimir V.; Ivanov, Jury I.; Chernyshev, Boris A.; Nikitkin, Vasily D.; Nikolaev, Anatoly F.; Trizno, Maya S.; Karkozov, Valery G.; Verkhoglyadova, Tatyana J.; Moskalev, Evgeny V.; and Yakovleva, Lidia I., 4,147,210, Cl. 165-165.000.

Ziemba, Richard T., to General Electric Company. Controlled range fuze. 4,147,109, Cl. 102-215.000.

Zimmerman, Clifton E., to Automators, Inc. Apparatus for automatic control of food forming machines. 4,147,485, Cl. 425-144.000.

Zinchuk, Michael, to Polaroid Corporation. Apparatus for displaying moving film on a television receiver. 4,148,071, Cl. 358-214.000.

Zippel, Herbert, to Herbert Zippel GmbH & Co. Device for joining consolidated lamellar material. 4,147,257, Cl. 211-45.000.

Zoecon Corporation: *See*—
Hayes, Norman J.; and Bulloch, Andrew C., 4,147,168, Cl. 128-330.000.

Zupancic, Boris; and Jenko, Branko, to LEK tovarna farmacevtskih ibn kemicnih izdelkov, n.sol.o. 1-(3-Benzoylphenyl)-propine and process for the preparation thereof. 4,147,729, Cl. 260-591.000.

# LIST OF DEFENSIVE PUBLICATIONS

APPLICANTS TO WHOM

## DEFENSIVE PUBLICATIONS WERE ISSUED ON THE 3RD DAY OF APRIL, 1979

Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O. G. 687.

Anderson, Samuel P.: *See*—
Bartron, Lester R.; Anderson, Samuel P.; and Michel, Rudolph H., T981,003, Cl. 264-210.00R.

Bartron, Lester R.; Anderson, Samuel P.; and Michel, Rudolph H., to Du Pont de Nemours, E. I., and Company. Filled, biaxially oriented, thermoplastic film having preferential shrinkage and method of making such film. T981,003, 4-3-79, Cl. 264-210.00R.

Brunswick Corporation: *See*—
Snyder, Richard H., T981,002, Cl. 73-182.000.

Caterpillar Tractor Co.: *See*—
McNeely, Robert T.; and Roussin, Michael A., T981,004, Cl. 308-26.000.
McReynolds, Charles P., T981,001, Cl. 37-118.00R.

Du Pont de Nemours, E. I., and Company: *See*—
Bartron, Lester R.; Anderson, Samuel P.; and Michel, Rudolph H., T981,003, Cl. 264-210.00R.

McNeely, Robert T.; and Roussin, Michael A., to Caterpillar Tractor Co. Resiliently mounted wheel assembly. T981,004, 4-3-79, Cl. 308-26.000.

McReynolds, Charles P., to Caterpillar Tractor Co. Bucket reinforcing structure. T981,001, 4-3-79, Cl. 37-118.00R.

Michel, Rudolph H.: *See*—
Bartron, Lester R.; Anderson, Samuel P.; and Michel, Rudolph H., T981,003, Cl. 264-210.00R.

Roussin, Michael A.: *See*—
McNeely, Robert T.; and Roussin, Michael A., T981,004, Cl. 308-26.000.

Snyder, Richard H., to Brunswick Corporation. Marine propulsion unit with water speed measurement means. T981,002, 4-3-79, Cl. 73-182.000.

---

# LIST OF REISSUE PATENTEES

TO WHOM

## PATENTS WERE ISSUED ON THE 3RD DAY OF APRIL, 1979

NOTE—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Bartha, Kenneth J., to Houdaille Industries, Inc. Punching device with punch retainer. Re. 29,950, Cl. 83-140.000.

Baxter Travenol Laboratories, Inc.: *See*—
Bornstein, Irene; and Kapsalis, Andreas A., Re. 29,955, Cl. 424-1.000.

Bornstein, Irene; and Kapsalis, Andreas A., to Baxter Travenol Laboratories, Inc. Method of detecting antigens or antibodies. Re. 29,955, Cl. 424-1.000.

Churchill, John W. Method of constructing bilateral heater unit. Re. 29,949, Cl. 29-611.000.

De Pauw, Agnes D. M.: *See*—
Lightenberg, Martinus A. C.; Stevels, Albert L. N.; and De Pauw, Agnes D. M., Re. 29,956, Cl. 250-486.000.

Herr, John A.: *See*—
Odermann, Charles R.; Peterson, Wesley R.; Herr, John A.; and Porter, Oswald M., Re. 29,952, Cl. 112-158.00E.

Houdaille Industries, Inc.: *See*—
Bartha, Kenneth J., Re. 29,950, Cl. 83-140.000.

Kapsalis, Andreas A.: *See*—
Bornstein, Irene; and Kapsalis, Andreas A., Re. 29,955, Cl. 424-1.000.

Larsen, Robert H.; and Minalga, Philip F., to Singer Company, The. Bight stop mechanism for sewing machines. Re. 29,951, Cl. 112-158.00E.

Lightenberg, Martinus A. C.; Stevels, Albert L. N.; and De Pauw, Agnes D. M., to U.S. Philips Corporation. Luminescent screen having a mosaic structure. Re. 29,956, Cl. 250-486.000.

Minalga, Philip F.: *See*—
Larsen, Robert H.; and Minalga, Philip F., Re. 29,951, Cl. 112-158.00E.

Odermann, Charles R.; Peterson, Wesley R.; Herr, John A.; and Porter, Oswald M., to Singer Company, The. Bight stop mechanism for sewing machines. Re. 29,952, Cl. 112-158.00E.

Peterson, Wesley R.: *See*—
Odermann, Charles R.; Peterson, Wesley R.; Herr, John A.; and Porter, Oswald M., Re. 29,952, Cl. 112-158.00E.

Porter, Oswald M.: *See*—
Odermann, Charles R.; Peterson, Wesley R.; Herr, John A.; and Porter, Oswald M., Re. 29,952, Cl. 112-158.00E.

Rostone Corporation: *See*—
Wilkinson, Robert E., Re. 29,954, Cl. 260-37.0EP.

Singer Company, The: *See*—
Larsen, Robert H.; and Minalga, Philip F., Re. 29,951, Cl. 112-158.00E.
Odermann, Charles R.; Peterson, Wesley R.; Herr, John A.; and Porter, Oswald M., Re. 29,952, Cl. 112-158.00E.

Stevels, Albert L. N.: *See*—
Lightenberg, Martinus A. C.; Stevels, Albert L. N.; and De Pauw, Agnes D. M., Re. 29,956, Cl. 250-486.000.

U.S. Philips Corporation: *See*—
Lightenberg, Martinus A. C.; Stevels, Albert L. N.; and De Pauw, Agnes D. M., Re. 29,956, Cl. 250-486.000.

Wilkinson, Robert E., to Rostone Corporation. Abrasion-resistant mineral-filled thermosetting molding composition. Re. 29,954, Cl. 260-37.0EP.

Wilson, Bobby R. Apparatus for supporting and positioning of a workpiece during welding. Re. 29,953, Cl. 269-60.000.

---

# LIST OF DESIGN PATENTEES

Advertising Displays Company: *See*—
Ciminelli, Philip, 251,466, Cl. D6-140.000.

Aigner, Boyd W. Heat radiating device or similar article. 251,500, 4-3-79, Cl. D23-72.000.

Airprint Systems, Inc.: *See*—
Warning, Walter B., Jr., 251,499, Cl. D23-35.000.

Albert, Ramon R. Bench or similar article. 251,460, 4-3-79, Cl. D6-59.000.

Allied Leisure Industries, Inc.: *See*—
Richter, Ian A.; and Braun, David H., 251,515, Cl. D21-10.000.

American Hospital Supply Corporation: *See*—
Bridle, Mark M., 251,502, Cl. D24-24.000.

Amerock Corporation: *See—*
Clayton, La Verne E., 251,475, Cl. D8-310.000.
Pittenger, Teresa R. B., 251,474, Cl. D8-310.000.
Tegner, Raymond U. H., 251,462, Cl. D6-103.000.
Tegner, Raymond U. H., 251,476, Cl. D8-318.000.

AMP Incorporated: *See—*
Snyder, Clair W., Jr.; Derr, Paul B.; and Wycheck, Thomas H., 251,491, Cl. D13-24.000.

Anderson, Samuel J., to International Blind Company. Bottom rail of a venetian blind assembly. 251,467, 4-3-79, Cl. D6-208.100.

Bancroft, Joseph C.; and Hallin, Peter R., to Croft Metals, Inc. Window component extrusion. 251,504, 4-3-79, Cl. D25-74.000.

Bancroft, Joseph C.; and Hallin, Peter R., to Croft Metals, Inc. Window component extrusion or similar article. 251,505, 4-3-79, Cl. D25-74.000.

Boden, Ogden W. Cord locking device. 251,478, 4-3-79, Cl. D8-383.000.

Bogren, Robert G.: *See—*
Hedstrom, Norman A.; Bogren, Robert G.; and Wright, David M., 251,477, Cl. D20-43.000.

Brasart, Rene, to Seiko Time Corporation. Ingot clock. 251,481, 4-3-79, Cl. D10-25.000.

Braun, David H.: *See—*
Richter, Ian A.; and Braun, David H., 251,515, Cl. D21-10.000.

Bridle, Mark M., to American Hospital Supply Corporation. Medicant transfer device. 251,502, 4-3-79, Cl. D24-24.000.

Cangelosi, Thomas M. Clothing hook for chain link fences. 251,463, 4-3-79, Cl. D6-122.000.

Cherry, Richard S., to Phillips Plastics of North America, Inc. Stackable tray. 251,479, 4-3-79, Cl. D9-219.000.

Cherry, Richard S., to Phillips Plastics of North America, Inc. Storage container. 251,480, 4-3-79, Cl. D9-219.000.

China Seas, Inc.: *See—*
Elliott, Inger M.; and Uglow, Helena, 251,469, Cl. D7-21.000.

Ciminelli, Philip, to Advertising Displays Company. Literature holder. 251,466, 4-3-79, Cl. D6-140.000.

Clayton, La Verne E., to Amerock Corporation. Knob. 251,475, 4-3-79, Cl. D8-310.000.

Clive Investments PTY, Limited: *See—*
Cowdroy, Thorp C., 251,506, Cl. D25-74.000.

Construction Specialties, Inc.: *See—*
Hallock, Edward C.; and Steinberg, Gary, 251,511, Cl. D25-91.000.

Cordell, Carl R., Jr. Fishing lure. 251,497, 4-3-79, Cl. D22-27.000.

Cowdroy, Thorp C., to Clive Investments PTY, Limited. Metal extrusion. 251,506, 4-3-79, Cl. D25-74.000.

Croft Metals, Inc.: *See—*
Bancroft, Joseph C.; and Hallin, Peter R., 251,504, Cl. D25-74.000.
Bancroft, Joseph C.; and Hallin, Peter R., 251,505, Cl. D25-74.000.

Cullen, Joseph W., Jr.; and Cullen, Roy L. Cattle chute. 251,490, 4-3-79, Cl. D12-105.000.

Cullen, Roy L.: *See—*
Cullen, Joseph W., Jr.; and Cullen, Roy L., 251,490, Cl. D12-105.000.

Derr, Paul B.: *See—*
Snyder, Clair W., Jr.; Derr, Paul B.; and Wycheck, Thomas H., 251,491, Cl. D13-24.000.

Dick, George. Adjustable hose clamp. 251,498, 4-3-79, Cl. D23-19.000.

Elliott, Inger M.; and Uglow, Helena, to China Seas, Inc. Serving tray. 251,469, 4-3-79, Cl. D7-21.000.

Enicks, James H. Hand protective pad member for athletic use. 251,459, 4-3-79, Cl. D2-361.000.

Freelander, Israel R. Holder for continuous sheet writing paper. 251,496, 4-3-79, Cl. D19-89.000.

Freeman, Kenneth A. Base for a measuring instrument. 251,483, 4-3-79, Cl. D10-74.000.

Freeman, Lorraine K. Nail care organizer tray or similar article. 251,512, 4-3-79, Cl. D28-61.000.

Gageby, Steven D. Chair. 251,461, 4-3-79, Cl. D6-67.000.

Garneau, John P. Sandwich roll. 251,456, 4-3-79, Cl. D1-24.000.

Hallin, Peter R.: *See—*
Bancroft, Joseph C.; and Hallin, Peter R., 251,504, Cl. D25-74.000.
Bancroft, Joseph C.; and Hallin, Peter R., 251,505, Cl. D25-74.000.

Hallock, Edward C.; and Steinberg, Gary, to Construction Specialties, Inc. Grille. 251,511, 4-3-79, Cl. D25-91.000.

Hamada, Masanori, to Matsushita Electric Industrial Co., Ltd. Radio receiver. 251,493, 4-3-79, Cl. D14-70.000.

Harada, Toshio: *See—*
Takahashi, Yoichi; Harada, Toshio; and Takahashi, Hanji, 251,473, Cl. D7-128.000.

Harrison, Saul E.; and Kraemer, Ira B. Guide assembly for drawing musical staff. 251,495, 4-3-79, Cl. D19-33.000.

Hedstrom, Norman A.; Bogren, Robert G.; and Wright, David M., to Wright Line Inc. Out-indicator for hanging filing system. 251,477, 4-3-79, Cl. D20-43.000.

Howard, James L., to Phifer, Earl Cooper, a part interest. Electrical testing instrument. 251,484, 4-3-79, Cl. D10-75.000.

Hutzler, Lawrence R.; and Uldall, Falle, to Hutzler Manufacturing Company, Inc. Sifter. 251,472, 4-3-79, Cl. D7-47.000.

Hutzler Manufacturing Company, Inc.: *See—*
Hutzler, Lawrence R.; and Uldall, Falle, 251,472, Cl. D7-47.000.

International Blind Company: *See—*
Anderson, Samuel J., 251,467, Cl. D6-208.100.

International Business Machines Corporation: *See—*
Kneale, Collan B.; and Wilkey, Frank, Jr., 251,492, Cl. D14-50.000.

John Lysaght (Australia) Limited: *See—*
Maricic, Alexander, 251,507, Cl. D25-74.000.
Maricic, Alexander, 251,508, Cl. D25-74.000.

Johnson & Johnson: *See—*
Kent, John R., 251,513, Cl. D28-64.000.

Jokari/US, Inc.: *See—*
Spivey, Lindsey G., II, 251,514, Cl. D21-213.000.

Kent, John R., to Johnson & Johnson. Dental flossing tool. 251,513, 4-3-79, Cl. D28-64.000.

Kneale, Collan B.; and Wilkey, Frank, Jr., to International Business Machines Corporation. Printer enclosure. 251,492, 4-3-79, Cl. D14-50.000.

Kraemer, Ira B.: *See—*
Harrison, Saul E.; and Kraemer, Ira B., 251,495, Cl. D19-33.000.

Lawhon, Charles L.: *See—*
Richards, Victor; and Lawhon, Charles L., 251,494, Cl. D16-12.000.

Lennemann, Leona M. Hanger for wigs, toupees, hats or the like. 251,468, 4-3-79, Cl. D6-247.000.

Lorenz, A. Michael. Statuette. 251,488, 4-3-79, Cl. D11-160.000.

Lutzker, Robert S. Cutting and serving board or similar article. 251,470, 4-3-79, Cl. D7-46.000.

Lutzker, Robert S. Cutting and serving board or similar article. 251,471, 4-3-79, Cl. D7-46.000.

Lutzker, Robert S. Planter. 251,486, 4-3-79, Cl. D11-151.000.

Lutzker, Robert S. Planter. 251,487, 4-3-79, Cl. D11-151.000.

Mantas, Nick. Boat. 251,489, 4-3-79, Cl. D12-62.000.

Margeson, John D., to Phillips & Brooks, Inc. Housing for telephones or the like. 251,465, 4-3-79, Cl. D6-132.000.

Maricic, Alexander, to John Lysaght (Australia) Limited. Support member for vehicle decking. 251,507, 4-3-79, Cl. D25-74.000.

Maricic, Alexander, to John Lysaght (Australia) Limited. Metal section. 251,508, 4-3-79, Cl. D25-74.000.

Masters, Robert R. Fire extinguisher storage cabinet. 251,464, 4-3-79, Cl. D6-127.000.

Matsushita Electric Industrial Co., Ltd.: *See—*
Hamada, Masanori, 251,493, Cl. D14-70.000.
Takahashi, Yoichi; Harada, Toshio; and Takahashi, Hanji, 251,473, Cl. D7-128.000.

Mertes, Thomas A. Slipper. 251,458, 4-3-79, Cl. D2-279.000.

Napco Security Systems, Inc.: *See—*
Stockdale, Roy, 251,485, Cl. D10-121.000.

Peterman, Dale A. Stove furnace. 251,501, 4-3-79, Cl. D23-97.000.

Phifer, Earl Cooper: *See—*
Howard, James L., 251,484, Cl. D10-75.000.

Phillips & Brooks, Inc.: *See—*
Margeson, John D., 251,465, Cl. D6-132.000.

Phillips Plastics of North America, Inc.: *See—*
Cherry, Richard S., 251,479, Cl. D9-219.000.
Cherry, Richard S., 251,480, Cl. D9-219.000.

Pittenger, Teresa R. B., to Amerock Corporation. Knob. 251,474, 4-3-79, Cl. D8-310.000.

Protective Treatments, Inc.: *See—*
Wenrick, Brian A., 251,509, Cl. D25-75.000.

Richards, Victor; and Lawhon, Charles L., to Richards, Victor. Stereoscopic viewer. 251,494, 4-3-79, Cl. D16-12.000.

Richter, Ian A.; and Braun, David H., to Allied Leisure Industries, Inc. Combined refreshment table and pinball machine casing. 251,515, 4-3-79, Cl. D21-10.000.

Schuring, James A. Building partition block. 251,510, 4-3-79, Cl. D25-86.000.

Seiko Time Corporation: *See—*
Brasart, Rene, 251,481, Cl. D10-25.000.

Snyder, Clair W., Jr.; Derr, Paul B.; and Wycheck, Thomas H., to AMP Incorporated. Environmentally sealed electrical connector assembly. 251,491, 4-3-79, Cl. D13-24.000.

Spivey, Lindsey G., II, to Jokari/US, Inc. Game paddle. 251,514, 4-3-79, Cl. D21-213.000.

Steinberg, Gary: *See—*
Hallock, Edward C.; and Steinberg, Gary, 251,511, Cl. D25-91.000.

Stockdale, Roy, to Napco Security Systems, Inc. Pulse code transmitter or similar article. 251,485, 4-3-79, Cl. D10-121.000.

Sugiyama, Koji, to Yazaki Sogyo Kabushiki Kaisha. Combined pressure and temperature gauge unit. 251,482, 4-3-79, Cl. D10-53.000.

Takahashi, Hanji: *See—*
Takahashi, Yoichi; Harada, Toshio; and Takahashi, Hanji, 251,473, Cl. D7-128.000.

Takahashi, Yoichi; Harada, Toshio; and Takahashi, Hanji, to Matsushita Electric Industrial Co., Ltd. Microwave oven. 251,473, 4-3-79, Cl. D7-128.000.

Tatro, Albert E. Spur pad. 251,457, 4-3-79, Cl. D2-27.000.

Tegner, Raymond U. H., to Amerock Corporation. Support for towel bar or the like. 251,462, 4-3-79, Cl. D6-103.000.

Tegner, Raymond U. H., to Amerock Corporation. Pull. 251,476, 4-3-79, Cl. D8-318.000.

Truitt, Roy L., Jr. Enclosure. 251,503, 4-3-79, Cl. D25-1.000.

Uglow, Helena: *See—*
Elliott, Inger M.; and Uglow, Helena, 251,469, Cl. D7-21.000.

Uldall, Falle: *See—*
Hutzler, Lawrence R.; and Uldall, Falle, 251,472, Cl. D7-47.000.

Warning, Walter B., Jr., to Airprint Systems, Inc. Spray head. 251,499, 4-3-79, Cl. D23-35.000.

Wenrick, Brian A., to Protective Treatments, Inc. Trim strip adapted to be secured to an automobile bumper or body. 251,509, 4-3-79, Cl. D25-75.000.

Wilkey, Frank, Jr.: *See—*
Kneale, Collan B.; and Wilkey, Frank, Jr., 251,492, Cl. D14-50.000.

Wright, David M.: *See—*
Hedstrom, Norman A.; Bogren, Robert G.; and Wright, David M., 251,477, Cl. D20-43.000.

Wright Line Inc.: *See—*
Hedstrom, Norman A.; Bogren, Robert G.; and Wright, David M., 251,477, Cl. D20-43.000.

Wycheck, Thomas H.: *See—*
Snyder, Clair W., Jr.; Derr, Paul B.; and Wycheck, Thomas H., 251,491, Cl. D13-24.000.

Yazaki Sogyo Kabushiki Kaisha: *See—*
Sugiyama, Koji, 251,482, Cl. D10-53.000.

# CLASSIFICATION OF PATENTS

## ISSUED APRIL 3, 1979

NOTE.—First number, class; second number, subclass; third number, patent number

**CLASS 2**

2 4,146,933
68 4,146,932
127 4,146,934
161 A 4,146,935

**CLASS 3**

1.91 4,146,936

**CLASS 4**

172.17 4,146,937
177 R 4,146,938
286 4,146,939

**CLASS 5**

9 B 4,146,940

**CLASS 8**

1 XB 4,147,507
17 4,147,508
18 R 4,147,509
39 C 4,147,510
94.18 4,147,511
165 4,147,512

**CLASS 9**

1.6 4,146,941

**CLASS 11**

1 B 4,146,942

**CLASS 13**

18 B 4,147,887
22 4,147,888

**CLASS 15**

111 4,146,943
321 4,146,944

**CLASS 17**

23 4,146,945

**CLASS 23**

230 B 4,147,514
232 E 4,147,513
4,147,515

**CLASS 26**

18.5 4,146,946
104 4,146,947

**CLASS 27**

2 4,146,948

**CLASS 29**

25.14 4,146,949
157 R 4,146,950
452 4,146,951
4,146,952
453 4,146,953
467 4,146,954
594 4,146,955
603 4,146,956
611 Re.29,949
612 4,146,957

**CLASS 30**

47 4,146,958
95 4,146,959
195 4,146,960
341 4,146,961
371 4,146,962

**CLASS 32**

17 4,146,963
27 4,146,964

**CLASS 33**

24 B 4,146,966
27 B 4,146,965
174 C 4,146,967
178 R 4,146,968
295 4,146,969
363 K 4,146,970

**CLASS 34**

5 4,146,971
41 4,146,972
4,146,973
54 4,146,974
134 4,146,975

**CLASS 35**

24 R 4,146,976
77 4,146,977
4,146,978

**CLASS 36**

39 4,146,980
67 D 4,146,979
100 4,146,981

**CLASS 37**

64 4,146,982

**CLASS 40**

124.1 4,146,983
152 4,146,984
158 B 4,146,985

**CLASS 42**

1 E 4,146,987

**CLASS 43**

17 4,146,988
55 4,146,989
88 4,146,990

**CLASS 44**

13 4,147,518
51 4,147,519
62 4,147,520

**CLASS 46**

202 4,146,991
221 4,146,992

**CLASS 47**

17 4,146,993

**CLASS 49**

367 4,146,994
468 4,146,995

**CLASS 52**

2 4,146,996
81 4,146,997
115 4,146,998
145 4,146,999
233 4,147,000
284 4,147,001
306 4,147,002
309.8 4,147,003
309.9 4,147,004
397 4,147,005
401 4,147,006
570 4,147,007
684 4,147,008
744 4,147,009

**CLASS 53**

64 4,147,010
137 4,147,011
468 4,147,012
494 4,147,013
559 4,147,014

**CLASS 54**

23 4,147,015

**CLASS 55**

2 4,147,521
6 4,147,522
208 4,147,523
521 4,147,524

**CLASS 56**

15.8 4,147,016
16.5 4,147,017
295 4,147,018

**CLASS 57**

66 4,147,019
289 4,147,020

**CLASS 58**

16 D 4,147,021
35 W 4,147,022

**CLASS 59**

86 4,147,023

**CLASS 60**

39.06 4,147,025
39.08 4,147,026
39.15 4,147,024
226 A 4,147,027
4,147,028
262 4,147,029
276 4,147,030
278 4,147,031
290 4,146,986
4,147,032
4,147,033
422 4,147,034
711 4,147,035

**CLASS 62**

23 4,147,525
113 4,147,037
180 4,147,038
349 4,147,039
467 R 4,147,040

**CLASS 64**

17 A 4,147,041

**CLASS 65**

11 W 4,147,526
183 4,147,527

**CLASS 66**

60 R 4,147,043
231 4,147,042

**CLASS 70**

119 4,147,044
314 4,147,045

**CLASS 71**

92 4,147,528
121 4,147,529

**CLASS 72**

68 4,147,046
114 4,147,047
137 4,147,048
349 4,147,049

**CLASS 73**

1 H 4,147,050
32 R 4,147,051
81 4,147,052
104 4,147,053
117.3 4,147,054
167 4,147,055
178 T 4,147,056
189 4,147,057
194 A 4,147,059
194 EM 4,147,058
321 4,147,060
341 4,147,061
422 GC 4,147,062
504 4,147,063
596 4,147,064
611 4,147,065

**CLASS 74**

5.1 4,147,066
29 4,147,067
230.17 E 4,147,068
231 C 4,147,069
242.11 C 4,147,070
409 4,147,071
416 4,147,072
424.8 R 4,147,073
559 4,147,074
720 4,147,075

**CLASS 75**

0.5 A 4,147,530
44 S 4,147,531
52 4,147,532
58 4,147,533
67 R 4,147,534
74 4,147,535
134 F 4,147,536
134 M 4,147,537
229 4,147,538
257 4,147,539

**CLASS 81**

63.2 4,147,076
367 4,147,077

**CLASS 83**

74 4,147,078
140 Re.29,950
170 4,147,079
371 4,147,080
407 4,147,081
440.1 4,147,082

**CLASS 84**

1.01 4,147,083
1.16 4,147,084
1.17 4,147,085
312 P 4,147,086
312 R 4,147,087

**CLASS 85**

41 4,147,088

**CLASS 90**

24 R 4,147,089
4,147,090

**CLASS 91**

376 R 4,147,091
490 4,147,092
510 4,147,093

**CLASS 92**

48 4,147,094

**CLASS 96**

1.2 4,147,540
1.5 4,147,541
27 E 4,147,542
29 D 4,147,544
29 R 4,147,543
49 4,147,545
60 R 4,147,546
74 4,147,547
77 4,147,548
85 4,147,549
87 A 4,147,550
94 R 4,147,551
115 R 4,147,552
122 4,147,553
130 4,147,554

**CLASS 98**

40 VM 4,147,095
122 4,147,096

**CLASS 99**

283 4,147,097
477 4,147,098
636 4,147,099

**CLASS 100**

48 4,147,100
118 4,147,101
257 4,147,102

**CLASS 101**

115 4,147,103
181 4,147,104
230 4,147,105
232 4,147,106

**CLASS 102**

43 P 4,147,107
67 4,147,108
215 4,147,109

**CLASS 104**

172 S 4,147,110

**CLASS 105**

463 4,147,111
4,147,112
477 4,147,113

**CLASS 106**

99 4,147,555
287.18 4,147,556

**CLASS 110**

221 4,147,114
244 4,147,115

**CLASS 111**

52 4,147,117

**CLASS 112**

158 E Re.29,951
Re.29,952
4,147,118
317 4,147,119
318 4,147,120

**CLASS 114**

204 4,147,121
218 4,147,122
260 4,147,123
321 4,147,124

**CLASS 115**

14 4,147,125

**CLASS 116**

315 4,147,215

**CLASS 118**

49.1 4,147,432
227 4,147,126
646 4,147,127
652 4,147,128

**CLASS 119**

1 4,147,129
3 4,147,130
5 4,147,131
53 4,147,132
55 4,147,133

**CLASS 122**

5 4,147,134
412 4,147,135

**CLASS 123**

3 4,147,136
32 ST 4,147,137
41.41 4,147,138
41.54 4,147,139
41.77 4,147,140
119 A 4,147,141
4,147,143
122 A 4,147,144
133 4,147,142
139 AW 4,147,146
148 DS 4,147,147
148 E 4,147,145
179 L 4,147,148
188 S 4,147,149
191 S 4,147,150
198 DC 4,147,151

**CLASS 124**

76 4,147,152

**CLASS 126**

63 4,147,153
270 4,147,154
271 4,147,155
4,147,156
4,147,157
4,147,158
351 4,147,159

**CLASS 127**

6 4,147,557

**CLASS 128**

2 R 4,147,161
2 S 4,147,160
2.06 B 4,147,162
9 4,147,163
76 R 4,147,164
214.4 4,147,165
266 4,147,166
303 R 4,147,167
330 4,147,168
349 B 4,147,169
349 BV 4,147,170
421 4,147,171

**CLASS 131**

2 4,147,172
21 B 4,147,173

**CLASS 132**

119 4,147,174

**CLASS 133**

3 D 4,147,175

**CLASS 134**

10 4,147,558
57 D 4,147,559

**CLASS 136**

89 H 4,147,560
206 4,147,561
213 4,147,562

**CLASS 137**

102 4,147,176
504 4,147,177
596.1 4,147,178
599 4,147,179
599.2 4,147,180
616.5 4,147,181
625.17 4,147,182
625.28 4,147,183
625.47 4,147,184

**CLASS 138**

121 4,147,185
155 4,147,186

**CLASS 139**

196.2 4,147,187

**CLASS 140**

101 4,147,188

**CLASS 141**

18 4,147,189

**CLASS 144**

2 Z 4,147,190
34 E 4,147,191
235 4,147,193
251 R 4,147,192
309 AC 4,147,194

**CLASS 148**

1.5 4,147,563
4,147,564
6.15 R 4,147,565
4,147,566
6.15 Z 4,147,567
32.5 4,147,568
128 4,147,569
144 4,147,570
175 4,147,571
4,147,572
4,147,573

**CLASS 156**

62.4 4,147,574
72 4,147,575
94 4,147,576
96 4,147,642
123 R 4,147,577
245 4,147,578
252 4,147,579
291 4,147,580
345 4,147,581
462 4,147,582
510 4,147,583
612 4,147,584

**CLASS 157**

1 4,147,195
13 4,147,196

**CLASS 160**

7 4,147,197
135 4,147,198
330 4,147,199

**CLASS 162**

135 4,147,585
4,147,586

**CLASS 164**

4 4,147,200
35 4,147,201
436 4,147,202

**CLASS 165**

2 4,147,203
4 4,147,204
26 4,147,205
32 4,147,206
106 4,147,207
159 4,147,208
161 4,147,209
165 4,147,210

**CLASS 166**

244 C 4,147,212
256 4,147,213
270 4,147,211
273 4,147,214

**CLASS 169**

70 4,147,216

**CLASS 172**

662 4,147,217
803 4,147,218

**CLASS 173**

12 4,147,219
170 4,147,220

**CLASS 174**

52 FP 4,147,889
127 4,147,890

**CLASS 175**

7 4,147,221
9 4,147,222
40 4,147,223

**CLASS 176**

19 LD 4,147,587
30 4,147,588
36 C 4,147,589
39 4,147,590
81 4,147,591

**CLASS 177**

210 FP 4,147,224

**CLASS 178**

69.1 4,147,891

**CLASS 179**

1 HF 4,147,892
2 A 4,147,893
15 A 4,147,894
15 AF 4,147,895
15 AS 4,147,896
18 AB 4,147,897
100.11 4,147,898
116 4,147,899
170 R 4,147,900
175.2 R 4,147,901
4,147,902
178 4,147,903
4,147,904

**CLASS 180**

44 R 4,147,225
64 R 4,147,318
70 R 4,147,226
77 C 4,147,227

**CLASS 181**

119 4,147,228
144 4,147,229
231 4,147,230

**CLASS 182**

172 4,147,231

**CLASS 184**

1 E 4,147,232
6.26 4,147,234
29 4,147,233

**CLASS 187**

29 R 4,147,235

**CLASS 188**

1 A 4,147,236
52 4,147,237
57 4,147,238
79.5 GC 4,147,239
218 XL 4,147,240
264 G 4,147,241

**CLASS 192**

4 A 4,147,242
6 A 4,147,243
4,147,244
85 AA 4,147,245

**CLASS 194**

9 T 4,147,246

**CLASS 195**

66 B 4,147,592

**CLASS 198**

347 4,147,247
358 4,147,248
459 4,147,249
472 4,147,250
688 4,147,251
732 4,147,252

**CLASS 200**

44 4,147,905
61.03 4,147,907
61.2 4,147,906
67 G 4,147,908
265 4,147,909

**CLASS 201**

21 4,147,593
39 4,147,594

**CLASS 202**

241 4,147,595

**CLASS 204**

1 T 4,147,596
12 4,147,597
35 N 4,147,598
87 4,147,599
98 4,147,600
103 4,147,601
157.1 R 4,147,602
159.12 4,147,603
159.23 4,147,604
180 P 4,147,605
180 S 4,147,606
196 4,147,607
4,147,608
224 M 4,147,609
228 4,147,610

**CLASS 206**

205 4,147,253
314 4,147,254
525 4,147,255

**CLASS 208**

9 4,147,615
74 4,147,617
108 4,147,611
4,147,612
120 4,147,613

**CLASS 209**

8 4,147,614
12 4,147,616
565 4,147,619
589 4,147,618
590 4,147,620
632 4,147,256

**CLASS 210**

22 C 4,147,621
23 H 4,147,622
31 R 4,147,623
32 4,147,624
50 4,147,625
52 4,147,626
58 4,147,627
83 4,147,628
104 4,147,629
137 4,147,630
4,147,631
222 4,147,632
232 4,147,633
396 4,147,634
401 4,147,635

**CLASS 211**

45 4,147,257

**CLASS 215**

252 4,147,268

**CLASS 219**

10.49 R 4,147,910
10.55 F 4,147,912
10.55 M 4,147,911
86.9 4,147,914
97 4,147,913
121 EB 4,147,915
121 EM 4,147,918
121 P 4,147,916
4,147,917
132 4,147,919
137.63 4,147,920
211 4,147,921
216 4,147,922
368 4,147,923
417 4,147,924
530 4,147,925
535 4,147,926
541 4,147,927

**CLASS 220**

1 B 4,147,269
22 4,147,270
70 4,147,271
89 B 4,147,272
204 4,147,273
226 4,147,274
323 4,147,276
400 4,147,277

**CLASS 222**

94 4,147,278
95 4,147,279
179.5 4,147,280
192 4,147,281
387 4,147,282
399 4,147,283
401 4,147,284

**CLASS 224**

48 D 4,147,286
177 4,147,285

**CLASS 226**

7 4,147,287

**CLASS 228**

43 4,147,288

**CLASS 229**

23 R 4,147,289
52 B 4,147,290
55 4,147,291

**CLASS 232**

35 4,147,292

**CLASS 233**

7 4,147,293
26 4,147,294

**CLASS 235**

454 4,147,928
463 4,147,295

**CLASS 236**

1 B 4,147,296
12 A 4,147,297
49 4,147,298
4,147,299

**CLASS 237**

1 A 4,147,300
8 R 4,147,301
9 R 4,147,302
55 4,147,303

**CLASS 238**

8 4,147,304

**CLASS 239**

167 4,147,305
327 4,147,306
542 4,147,307

**CLASS 241**

117 4,147,308
215 4,147,309

**CLASS 242**

25 A 4,147,310
47.01 4,147,311
72 R 4,147,312
84.2 G 4,147,313
179 4,147,314
192 4,147,315

**CLASS 244**

102 R 4,147,316
116 4,147,317

**CLASS 248**

318 4,147,320
354 R 4,147,321
582 4,147,319

**CLASS 249**

40 4,147,322
79 4,147,323
170 4,147,324

**CLASS 250**

207 4,147,929
223 R 4,147,930
273 4,147,931
330 4,147,932
370 4,147,933
4,147,934
416 TV 4,147,935
444 4,147,662
445 T 4,147,936
486 Re.29,956
492 A 4,147,937
506 4,147,938

**CLASS 251**

25 4,147,325
162 4,147,326
174 4,147,327

**CLASS 252**

8.1 4,147,636
8.55 D 4,147,637
4,147,638
25 4,147,639
45 4,147,640
48.2 4,147,666
51.5 A 4,147,641
52 R 4,147,643
61 4,147,644
62.1 P 4,147,645
63.7 4,147,646
82 4,147,647
89 B 4,147,648
89 R 4,147,649
103 4,147,650
156 4,147,652
182 4,147,653
186 4,147,654
299 4,147,651
4,147,655
4,147,656
313 S 4,147,657
384 4,147,658
400 A 4,147,659
412 4,147,660
428 4,147,663
429 B 4,147,664
435 4,147,661
463 4,147,665
501 4,147,667
503 4,147,668
512 4,147,669
519 4,147,670
522 4,147,671
4,147,672
548 4,147,673

**CLASS 254**

89 R 4,147,328
132 4,147,329
173 R 4,147,330

**CLASS 260**

17 R 4,147,674
22 CB 4,147,675
23 TN 4,147,676
23.5 A 4,147,677
28.5 R 4,147,678
29.2 TN 4,147,679
4,147,680
29.6 F 4,147,683
29.6 SQ 4,147,682
29.6 TA 4,147,681
30.8 R 4,147,684
31.2 R 4,147,685
31.8 R 4,147,686
33.6 EP 4,147,688
33.6 R 4,147,687
37 EP Re.29,954
37 SB 4,147,707
45.7 R 4,147,690
45.9 NC 4,147,689
112 R 4,147,691
112.5 R 4,147,692
239.55 C 4,147,695
301 4,147,698
306.7 C 4,147,699
308 D 4,147,701
308 R 4,147,700
340.6 4,147,702
343.21 4,147,703
343.45 4,147,704
345.9 R 4,147,705
365 4,147,706
413 4,147,708
429.3 4,147,709
429.9 4,147,710
448.2 N 4,147,711
448.8 R 4,147,712
4,147,713
453 AB 4,147,714
455 A 4,147,715
465 D 4,147,716
465.8 R 4,147,717
465.9 4,147,718
501.12 4,147,719
502 R 4,147,720
543 H 4,147,722
556 A 4,147,723
570 D 4,147,724
578 4,147,725
586 R 4,147,726
4,147,727
590 D 4,147,728
591 4,147,729
604 HF 4,147,730
644 4,147,731
646 4,147,732
653.4 4,147,733
672 R 4,147,734
674 WC 4,147,735
681 4,147,736
835 4,147,737
860 4,147,738
876 R 4,147,739
878 R 4,147,740
4,147,741
897 R 4,147,742
924 4,147,743

**CLASS 264**

1 4,147,744
22 4,147,745
39 4,147,746
65 4,147,747
167 4,147,749
255 4,147,750
326 4,147,751
523 4,147,748

**CLASS 266**

44 4,147,332
48 4,147,333
89 4,147,334
261 4,147,335

**CLASS 267**

111 4,147,336

**CLASS 269**

60 Re.29,953

**CLASS 270**

19 4,147,337
37 4,147,338

**CLASS 271**

7 4,147,339
122 4,147,341
218 4,147,340
221 4,147,342

**CLASS 272**

33 B 4,147,343
136 4,147,344

**CLASS 273**

2 4,147,345
23 4,147,346
57 4,147,347
73 C 4,147,348
77 A 4,147,349
85 R 4,147,350
86 B 4,147,351
93 R 4,147,352
95 A 4,147,353
97 R 4,147,354
101.1 4,147,355
164 4,147,357
183 B 4,147,356
241 4,147,358
4,147,359
261 4,147,360
271 4,147,361
282 4,147,362
304 4,147,363

**CLASS 274**

1 R 4,147,364
9 RA 4,147,365

**CLASS 277**

22 4,147,366
152 4,147,367
182 4,147,368

**CLASS 280**

30 4,147,369
234 4,147,370
276 4,147,371
433 4,147,372
445 4,147,373
478 R 4,147,374
483 4,147,375
489 4,147,376
609 4,147,377
633 4,147,378
781 4,147,379

**CLASS 281**

29 4,147,380

**CLASS 285**

53 4,147,381
189 4,147,382
373 4,147,383
382.2 4,147,384
382.4 4,147,385

**CLASS 297**

362 4,147,386
388 4,147,387

**CLASS 299**

2 4,147,388
4,147,389
8 4,147,390
75 4,147,391

**CLASS 302**

52 4,147,392

**CLASS 303**

118 4,147,394

**CLASS 307**

116 4,147,939
205 4,147,940
232 4,147,941
273 4,147,942
355 4,147,943
362 4,147,944

**CLASS 308**

3.6 4,147,393
10 4,147,396

**CLASS 310**

115 4,147,945
214 4,147,946

**CLASS 312**

140.2 4,147,395

**CLASS 313**

27 4,147,947
101 4,147,948
4,147,949
181 4,147,950
220 4,147,951
4,147,952
299 4,147,953
337 4,147,954

**CLASS 315**

3.5 4,147,955
3.6 4,147,956
111.2 4,147,957
169.4 4,147,958
291 4,147,961
4,147,962
387 4,147,963
411 4,147,964

**CLASS 318**

256 4,147,965
327 4,147,966
341 4,147,967
685 4,147,968

**CLASS 320**

2 4,147,969
21 4,147,970

**CLASS 323**

4 4,147,971
24 4,147,972

**CLASS 324**

0.5 F 4,147,974
3 4,147,973
28 CB 4,147,975
32 4,147,981
54 4,147,982
61 R 4,147,976
103 R 4,147,983
121 R 4,147,977
142 4,147,978
244 4,147,979

**CLASS 325**

24 4,147,980
25 4,147,984
144 4,147,985
316 4,147,986
455 4,147,987

**CLASS 328**

124 4,147,988
142 4,147,989

**CLASS 330**

11 4,147,990
284 4,147,991
288 4,147,992

**CLASS 331**

1 A 4,147,993
56 4,147,994
94.5 PE 4,147,995
111 4,147,996

**CLASS 333**

181 4,148,003
214 4,147,997
238 4,147,998

**CLASS 335**

35 4,147,999
58 4,148,000
205 4,148,001

**CLASS 337**

74 4,148,002
82 4,148,004

**CLASS 338**

28 4,148,005

**CLASS 339**

17 C 4,147,397
98 4,147,398
99 R 4,147,399
217 S 4,147,400

**CLASS 340**

15.5 TS 4,148,006
52 F 4,148,007
58 4,148,008
146.3 C 4,148,010
146.3 H 4,148,009
147 LP 4,148,011
149 A 4,148,012
189 M 4,148,013
347 DA 4,148,016
365 S 4,148,017
401 4,148,018
531 4,148,019
4,148,020
4,148,021
628 4,148,022
4,148,023
638 4,148,024
709 4,148,014
763 4,148,015
769 4,147,960
779 4,147,959

**CLASS 343**

5 SA 4,148,027
5 ST 4,148,026
5 VQ 4,148,025
7 VM 4,148,028
9 4,148,029
18 A 4,148,032

18 C 4,148,033
100 TD 4,148,031
106 D 4,148,034
708 4,148,040
754 4,148,035
788 4,148,036
846 4,148,037
858 4,148,038
872 4,148,039
895 4,148,030

**CLASS 346**

140 R 4,148,041
155 4,148,042
157 4,148,043

**CLASS 350**

6.8 4,147,401
96.18 4,147,402
4,147,403
96.21 4,147,404
4,147,405
96.23 4,147,406
96.34 4,147,407
128 4,147,408
164 4,147,409
184 4,147,410
240 4,147,411
252 4,147,412
253 4,147,413
289 4,147,414
321 4,147,415
357 4,147,416

**CLASS 354**

25 4,147,417
27 4,147,418
66 4,147,419
127 4,147,420
192 4,147,421
299 4,147,422
304 4,147,425
344 4,147,423

**CLASS 355**

3 SH 4,147,426
72 4,147,427
88 4,147,428
133 4,147,429

**CLASS 356**

51 4,147,430
72 4,147,431
312 4,147,434
352 4,147,424
357 4,147,435
390 4,147,433

**CLASS 357**

17 4,148,045
23 4,148,044
4,148,046
4,148,047
4,148,049
30 4,148,048
4,148,050
4,148,051
4,148,052
38 4,148,053
44 4,148,054
4,148,055
73 4,148,056

**CLASS 358**

4 4,148,057
24 4,148,058
37 4,148,059
83 4,148,060
101 4,148,061
4,148,065
105 4,148,062
114 4,148,063
118 4,148,064
127 4,148,066
128 4,148,067
153 4,148,068
160 4,148,069
4,148,070
214 4,148,071
224 4,148,072
240 4,148,073
242 4,148,074
267 4,148,075
286 4,148,076

**CLASS 360**

10 4,148,077
27 4,148,078
36 4,148,079
51 4,148,080
67 4,148,081
77 4,148,082
4,148,083
98 4,148,084

**CLASS 361**

13 4,148,085
37 4,148,086
80 4,148,087
93 4,148,088
119 4,148,089
152 4,148,090
156 4,148,091
172 4,148,092

**CLASS 362**

6 4,148,093
109 4,148,094
223 4,148,095
252 4,148,096

**CLASS 363**

26 4,148,097

**CLASS 364**

200 4,148,098

**CLASS 365**

226 4,148,099

**CLASS 366**

25 4,147,436
46 4,147,331
150 4,148,100
262 4,148,101
343 4,147,437

**CLASS 400**

144.2 4,147,438
208 4,147,439
611 4,147,440

**CLASS 401**

208 4,147,441

**CLASS 403**

4 4,147,442
267 4,147,443
313 4,147,444
372 4,147,445
390 4,147,446

**CLASS 404**

16 4,147,447
124 4,147,448

**CLASS 405**

74 4,147,450
90 4,147,451
134 4,147,452
141 4,147,453
154 4,147,449
156 4,147,454
172 4,147,455
205 4,147,036
210 4,147,456
232 4,147,457
259 4,147,458
303 4,147,459

**CLASS 408**

1 R 4,147,460
46 4,147,461
80 4,147,462
156 4,147,463
206 4,147,464

**CLASS 414**

98 4,147,260
411 4,147,264
416 4,147,265
480 4,147,266
498 4,147,267
557 4,147,261
680 4,147,258
687 4,147,262
718 4,147,263
745 4,147,259

**CLASS 415**

143 4,147,465
174 4,147,466
196 4,147,467
213 R 4,147,468

**CLASS 416**

70 R 4,147,469
95 4,147,470
132 A 4,147,471
193 R 4,147,472

**CLASS 417**

53 4,147,473
54 4,147,474
310 4,147,475
328 4,147,476
343 4,147,477
458 4,147,478
540 4,147,479
572 4,147,480
4,147,481

**CLASS 418**

138 4,147,825

**CLASS 422**

57 4,147,752
99 4,147,516
202 4,147,753
242 4,147,517

**CLASS 423**

224 4,147,754
242 4,147,755
4,147,756
313 4,147,757
315 4,147,758
327 4,147,759
336 4,147,760
473 4,147,761
569 4,147,762
570 4,147,763

**CLASS 424**

1 Re.29,955
4,147,764
12 4,147,765
14 4,147,766
22 4,147,767
35 4,147,768
45 4,147,770
47 4,147,769
84 4,147,771
89 4,147,772
93 4,147,773
118 4,147,774
150 4,147,775
175 4,147,776
181 4,147,777
4,147,778
195 4,147,779
211 4,147,780
4,147,781
230 4,147,782
243 4,147,783
246 4,147,693
250 4,147,784
4,147,785
4,147,790
251 4,147,786
256 4,147,787
258 4,147,788
261 4,147,789
269 4,147,791
4,147,792
4,147,793
270 4,147,794
273 R 4,147,795
4,147,796
4,147,797
279 4,147,798
282 4,147,799
312 4,147,800
315 4,147,801
319 4,147,802
320 4,147,803
322 4,147,804
330 4,147,805
343 4,147,806

**CLASS 425**

46 4,147,482
65 4,147,483
142 4,147,484
144 4,147,485
157 4,147,486
174.4 4,147,487
174.8 E 4,147,488
355 4,147,489
4,147,490
385 4,147,491
394 4,147,492

**CLASS 426**

56 4,147,807
477 4,147,808
499 4,147,809
629 4,147,810
634 4,147,811

**CLASS 427**

17 4,147,812
27 4,147,813
64 4,147,815
67 4,147,816
118 4,147,817
133 4,147,818
195 4,147,819
248 C 4,147,820
295 4,147,821

**CLASS 428**

35 4,147,822
4,147,823
55 4,147,824
151 4,147,826
218 4,147,827
255 4,147,828
311 4,147,829
324 4,147,830
356 4,147,831
375 4,147,832
378 4,147,833
407 4,147,834
450 4,147,835
481 4,147,836
548 4,147,837

**CLASS 429**

1 4,147,838
15 4,147,839
50 4,147,840
86 4,147,841
101 4,147,842
109 4,147,843

**CLASS 431**

15 4,147,493
23 4,147,495
43 4,147,496
71 4,147,494
202 4,147,498
255 4,147,499
359 4,147,497

**CLASS 432**

2 4,147,500
60 4,147,501
72 4,147,502
78 4,147,503
101 4,147,504
118 4,147,505
148 4,147,506

**CLASS 472**

51 4,147,814

**CLASS 521**

27 4,147,844
56 4,147,845
110 4,147,846
112 4,147,847

**CLASS 526**

77 4,147,848
96 4,147,849
207 4,147,850
245 4,147,851
272 4,147,852
278 4,147,853
312 4,147,854

**CLASS 528**

23 4,147,855
92 4,147,856
94 4,147,857
210 4,147,858
496 4,147,859

**CLASS 536**

4 4,147,860
10 4,147,861

**CLASS 542**

415 4,147,862
436 4,147,863

**CLASS 544**

16 4,147,864
142 4,147,865
243 4,147,866
244 4,147,867
353 4,147,868
363 4,147,869
383 4,147,870
394 4,147,871

**CLASS 546**

169 4,147,694
198 4,147,696
216 4,147,872
221 4,147,873
251 4,147,874
258 4,147,697

**CLASS 548**

302 4,147,875

**CLASS 560**

37 4,147,876
53 4,147,877
115 4,147,878
121 4,147,879
142 4,147,880
221 4,147,881

**CLASS 562**

410 4,147,882
523 4,147,883
532 4,147,721
533 4,147,884
535 4,147,885

**CLASS 568**

824 4,147,886

## CLASSIFICATION OF DESIGNS

D1— 24 251,456
D2— 27 251,457
279 251,458
361 251,459
D6— 59 251,460
67 251,461
103 251,462
122 251,463
127 251,464
132 251,465
140 251,466
208.1 251,467
247 251,468
D7— 21 251,469
46 251,470
251,471
47 251,472
128 251,473
D8— 310 251,474
251,475
318 251,476
383 251,478
D9— 219 251,479
251,480
D10— 25 251,481
53 251,482
74 251,483
75 251,484
D11— 121 251,485
151 251,486
251,487
160 251,488
D12— 62 251,489
105 251,490
D13— 24 251,491
D14— 50 251,492
70 251,493
D16— 12 251,494
D19— 33 251,495
89 251,496
D20— 43 251,477
D21— 10 251,515
213 251,514
D22— 27 251,497
D23— 19 251,498
35 251,499
72 251,500
97 251,501
D24— 24 251,502
D25— 1 251,503
74 251,504
251,505
251,506
251,507
251,508
75 251,509
86 251,510
91 251,511
D28— 61 251,512
64 251,513

## DEFENSIVE PUBLICATIONS APPLICATIONS

[Notice of Dec. 16, 1969, 869 O.G. 6877]

37— 118 R T981,001
73— 182 T981,002
264— 210 R T981,003
308— 26 T981,004

# GEOGRAPHICAL INDEX
# OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)


| | | | | | |
|---|---|---|---|---|---|
| Alabama | 1 | Kentucky | 21 | Oregon | 41 |
| Alaska | 2 | Louisiana | 22 | Pennsylvania | 42 |
| American Samoa | 3 | Maine | 23 | Puerto Rico | 43 |
| Arizona | 4 | Maryland | 24 | Rhode Island | 44 |
| Arkansas | 5 | Massachusetts | 25 | South Carolina | 45 |
| California | 6 | Michigan | 26 | South Dakota | 46 |
| Canal Zone | 7 | Minnesota | 27 | Tennessee | 47 |
| Colorado | 8 | Mississippi | 28 | Texas | 48 |
| Connecticut | 9 | Missouri | 29 | Utah | 49 |
| Delaware | 10 | Montana | 30 | Vermont | 50 |
| District of Columbia | 11 | Nebraska | 31 | Virginia | 51 |
| Florida | 12 | Nevada | 32 | Virgin Islands | 52 |
| Georgia | 13 | New Hampshire | 33 | Washington | 53 |
| Guam | 14 | New Jersey | 34 | West Virginia | 54 |
| Hawaii | 15 | New Mexico | 35 | Wisconsin | 55 |
| Idaho | 16 | New York | 36 | Wyoming | 56 |
| Illinois | 17 | North Carolina | 37 | U.S. Air Force | 57 |
| Indiana | 18 | North Dakota | 38 | U.S. Army | 58 |
| Iowa | 19 | Ohio | 39 | U.S. Navy | 59 |
| Kansas | 20 | Oklahoma | 40 | | |


(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

## PATENTS

4 : 4,147,164
5 : 4,147,195
4,147,893
6 : 4,146,935
4,146,979
4,147,009
4,147,057
4,147,060
4,147,254
4,147,274
4,147,276
4,147,280
4,147,299
4,147,481
4,147,635
4,147,932
4,148,018
4,148,099
8 : 4,147,185
9 : 4,146,958
4,146,959
4,147,433
4,147,446
4,147,705
4,147,746
4,147,755
4,147,795
4,147,974
01 : 4,147,061
4,147,115
04 : 4,147,059
4,147,309
4,147,329
4,147,458
4,147,971
4,147,980
4,147,992
05 : 4,147,152
06 : 4,146,938
4,146,951
4,146,962
4,146,964
4,146,989
4,146,992
4,147,005
4,147,017
4,147,035
4,147,055
4,147,063
4,147,081
4,147,084
4,147,087
4,147,102
4,147,124
4,147,157
4,147,159
4,147,176
4,147,206
4,147,211
4,147,222
4,147,226
4,147,289
4,147,294
4,147,298
4,147,307
4,147,314
4,147,315
4,147,316
4,147,320
4,147,331
4,147,352
4,147,359
4,147,388
4,147,392
4,147,409
4,147,414
4,147,422
4,147,424
4,147,431
4,147,450
4,147,469
4,147,480
4,147,564
4,147,571
4,147,578
4,147,584
4,147,590
4,147,593
4,147,630
4,147,632
4,147,651
4,147,669
4,147,713
4,147,715
4,147,731
4,147,769
4,147,809
4,147,820
4,147,889
4,147,890
4,147,892
4,147,901
4,147,903
4,147,929
4,147,937
4,147,942
4,147,943
4,147,944
4,147,977
4,147,998
4,148,003
4,148,006
4,148,011
4,148,012
4,148,031
4,148,036
4,148,080
4,148,084
4,148,092
4,148,094
4,148,098
08 : 4,146,977
4,147,285
4,147,300
4,147,389
4,147,413
4,147,435
13 : 4,147,631
4,147,637
4,147,638
4,147,896
09 : 4,146,960
4,146,974
4,147,024
4,147,045
4,147,049
4,147,089
4,147,090
4,147,156
4,147,220
4,147,306
4,147,441
4,147,570
4,147,627
4,147,644
4,147,678
4,147,712
4,147,761
4,147,797
4,147,846
4,147,872
4,147,921
4,147,950
4,147,996
4,148,004
4,148,076
10 : 4,147,317
4,147,511
4,147,551
4,147,663
4,147,683
4,147,788
4,147,851
4,147,860
4,147,878
12 : 4,146,955
4,146,969
4,147,003
4,147,018
4,147,072
4,147,229
4,147,256
4,147,286
4,147,411
4,147,415
4,147,529
4,147,557
4,147,775
4,147,807
4,147,838
13 : 4,146,953
4,147,020
4,147,290
4,147,407
4,147,484
4,147,999
16 : 4,147,000
4,147,154
17 : Re.29,955
4,146,940
4,146,976
4,146,978
4,146,983
4,146,987
4,147,034
4,147,038
4,147,044
4,147,062
4,147,092
4,147,100
4,147,120
4,147,169
4,147,170
4,147,174
4,147,177
4,147,184
4,147,188
4,147,212
4,147,218
4,147,238
4,147,248
4,147,250
4,147,253
4,147,283
4,147,296
4,147,319
4,147,355
4,147,356
4,147,358
4,147,361
4,147,394
4,147,406
4,147,439
4,147,442
4,147,447
4,147,456
4,147,470
4,147,475
4,147,521
4,147,539
4,147,741
4,147,742
4,147,770
4,147,818
4,147,837
4,147,905
4,147,919
4,147,939
4,147,946
4,148,022
4,148,068
4,148,069
4,148,073
4,148,097
18 : Re.29,954
4,146,971
4,146,994
4,146,998
4,147,069
4,147,085
4,147,093
4,147,132
4,147,186
4,147,237
4,147,239
4,147,241
4,147,514
4,147,615
4,147,738
4,147,805
4,147,912
4,147,964
19 : 4,147,016
4,147,305
4,147,323
20 : 4,147,768
4,147,985
21 : 4,147,037
4,147,070
4,147,297
4,147,304
4,147,834
22 : 4,146,945
4,147,112
4,147,217
4,147,360
4,147,613
4,147,733
23 : 4,147,396
4,148,034
24 : 4,147,096
4,147,108
4,147,216
4,147,344
4,147,502
4,147,519
4,147,690
4,147,785
4,147,798
4,147,940
4,148,005
4,148,029
25 : Re.29,949
4,146,949
4,146,984
4,147,040
4,147,122
4,147,162
4,147,246
4,147,288
4,147,408
4,147,418
4,147,425
4,147,497
4,147,562
4,147,618
4,147,624
4,147,639
4,147,656
4,147,668
4,147,699
4,147,744
4,147,748
4,147,763
4,147,813
4,147,816

4,147,840
4,147,864
4,147,866
4,147,952
4,147,957
4,147,959
4,147,973
4,147,990
4,147,994
4,147,995
4,148,013
4,148,071
4,148,075
4,148,078
4,148,096
26 : 4,146,942
4,147,066
4,147,110
4,147,113
4,147,131
4,147,200
4,147,270
4,147,379
4,147,393
4,147,436
4,147,440
4,147,462
4,147,463
4,147,479
4,147,518
4,147,533
4,147,566
4,147,576
4,147,646
4,147,704
4,147,723
4,147,725
4,147,784
4,147,847
4,147,852
4,147,877
4,147,879
4,147,906
4,147,914
4,147,916
4,148,049
4,148,100
27 : 4,146,948
4,146,954
4,146,968
4,147,001
4,147,080
4,147,106
4,147,263
4,147,340
4,147,427
4,147,478
4,147,694
4,147,767
4,147,810
4,147,904
4,147,969
4,148,020
4,148,046
4,148,047
29 : 4,146,995
4,147,203

4,147,328
4,147,357
4,147,586
4,147,607
4,147,647
4,147,654
4,147,702
4,147,709
4,147,719
4,147,822
31 : 4,146,996
33 : 4,147,086
4,147,369
4,148,008
34 : Re.29,951
Re.29,952
4,146,944
4,146,957
4,146,970
4,146,985
4,147,043
4,147,053
4,147,118
4,147,119
4,147,282
4,147,346
4,147,363
4,147,405
4,147,443
4,147,516
4,147,520
4,147,530
4,147,545
4,147,581
4,147,597
4,147,617
4,147,623
4,147,628
4,147,652
4,147,657
4,147,662
4,147,674
4,147,677
4,147,698
4,147,703
4,147,708
4,147,720
4,147,727
4,147,750
4,147,762
4,147,766
4,147,786
4,147,800
4,147,801
4,147,803
4,147,804
4,147,831
4,147,841
4,147,871
4,147,875
4,147,884
4,147,902
4,147,941
4,147,947
4,148,000
4,148,027
4,148,058

4,148,061
4,148,087
4,148,089
35 : 4,147,370
4,147,938
4,148,050
36 : Re.29,950
4,146,934
4,146,946
4,146,966
4,146,988
4,146,999
4,147,010
4,147,027
4,147,050
4,147,068
4,147,133
4,147,163
4,147,166
4,147,194
4,147,219
4,147,228
4,147,235
4,147,272
4,147,281
4,147,284
4,147,302
4,147,303
4,147,342
4,147,345
4,147,348
4,147,354
4,147,397
4,147,429
4,147,522
4,147,540
4,147,541
4,147,544
4,147,550
4,147,552
4,147,575
4,147,645
4,147,658
4,147,685
4,147,706
4,147,716
4,147,721
4,147,730
4,147,734
4,147,739
4,147,740
4,147,754
4,147,764
4,147,827
4,147,839
4,147,842
4,147,853
4,147,925
4,147,928
4,147,948
4,147,949
4,147,958
4,147,981
4,148,023
4,148,045
4,148,059

4,148,060
4,148,063
4,148,066
37 : 4,146,939
4,147,088
4,147,153
4,147,399
4,147,983
39 : Re.29,953
4,146,952
4,147,004
4,147,029
4,147,071
4,147,076
4,147,097
4,147,111
4,147,155
4,147,167
4,147,178
4,147,207
4,147,225
4,147,233
4,147,258
4,147,265
4,147,278
4,147,312
4,147,362
4,147,373
4,147,380
4,147,383
4,147,395
4,147,430
4,147,482
4,147,487
4,147,513
4,147,526
4,147,555
4,147,558
4,147,559
4,147,580
4,147,599
4,147,605
4,147,643
4,147,650
4,147,751
4,147,802
4,147,808
4,147,823
4,147,825
4,147,826
4,147,844
4,147,854
4,147,858
4,147,859
4,147,868
4,147,880
4,147,967
40 : 4,147,036
4,147,213
4,147,625
4,147,726
41 : 4,146,943
4,146,973
4,147,292
4,147,619
4,147,988

4,148,042
42 : 4,146,961
4,146,967
4,146,997
4,147,002
4,147,082
4,147,083
4,147,151
4,147,160
4,147,273
4,147,310
4,147,324
4,147,398
4,147,400
4,147,451
4,147,464
4,147,486
4,147,493
4,147,495
4,147,506
4,147,524
4,147,528
4,147,531
4,147,556
4,147,589
4,147,602
4,147,641
4,147,679
4,147,681
4,147,686
4,147,687
4,147,688
4,147,701
4,147,772
4,147,781
4,147,782
4,147,833
4,147,850
4,147,856
4,147,882
4,147,961
4,147,962
4,147,968
4,147,982
4,148,001
4,148,024
4,148,030
4,148,035
4,148,052
4,148,057
44 : 4,147,199
4,147,277
4,147,326
4,147,596
45 : 4,146,937
4,147,491
46 : 4,147,301
47 : 4,147,180
4,147,264
4,147,384
4,147,563
4,147,603
4,147,689
4,147,732
4,147,920
4,147,923

48 : 4,146,950
4,147,015
4,147,095
4,147,183
4,147,197
4,147,214
4,147,215
4,147,221
4,147,223
4,147,325
4,147,327
4,147,353
4,147,372
4,147,498
4,147,594
4,147,601
4,147,606
4,147,684
4,147,757
4,147,857
4,147,924
4,147,978
4,147,984
4,148,014
4,148,064
49 : 4,146,933
4,146,941
4,147,114
4,147,610
4,147,621
4,147,634
4,147,756
50 : 4,147,109
51 : 4,146,972
4,147,205
4,147,269
4,147,343
4,147,515
4,147,749
4,147,900
53 : 4,146,993
4,147,056
4,147,137
4,147,171
4,147,232
4,147,287
4,147,347
4,147,385
4,147,485
4,147,600
4,147,620
4,148,032
4,148,039
4,148,040
4,148,091
55 : 4,147,073
4,147,104
4,147,230
4,147,333
4,147,367
4,147,376
4,147,836
4,147,976
4,148,019
4,148,101
56 : 4,147,168

## DESIGN PATENTS

05 : 251,497
06 : 251,457
251,458
251,478
251,483
251,494
251,502
08 : 251,498
11 : 251,468

12 : 251,456
251,489
251,515
13 : 251,465
16 : 251,490
17 : 251,474
251,475
251,488
251,499

251,512
25 : 251,477
251,496
27 : 251,461
251,492
28 : 251,504
251,505
34 : 251,459
251,466

251,495
251,511
36 : 251,460
251,463
251,469
251,470
251,471
251,472

251,485
251,486
251,487
39 : 251,509
251,510
41 : 251,501
42 : 251,467
251,491

251,513
45 : 251,484
48 : 251,464
251,503
251,514
53 : 251,500
55 : 251,462
251,476

## DEFENSIVE PUBLICATIONS APPLICATIONS

[Notice of Dec. 16, 1969, 869 O.G. 6877]

10 : T981,003
17 : T981,001
T981,004
55 : T981,002

U. S. GOVERNMENT PRINTING OFFICE : 0 - 1979

## CHANGE OF ADDRESS FORM

NAME—FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY | STATE | ZIP CODE

PLEASE PRINT OR TYPE

(or) COUNTRY

Mail this form to: NEW ADDRESS

Superintendent of Documents
Government Printing Office SSOM
Washington, D.C. 20402

Attach last subscription label here.

## SUBSCRIPTION ORDER FORM

**SUBSCRIPTION ORDER FORM**

**ENTER MY SUBSCRIPTION TO:**

**@ $ Domestic; @ $ Foreign.**

NAME—FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY | STATE | ZIP CODE

PLEASE PRINT OR TYPE

(or) COUNTRY

☐ Remittance Enclosed (Make checks payable to Superintendent of Documents)

☐ Charge to my Deposit Account No. .....

MAIL ORDER FORM TO:
Superintendent of Documents
Government Printing Office
Washington, D.C. 20402

U.S. DEPARTMENT OF COMMERCE
Juanita M. Kreps, *Secretary*

PATENT AND TRADEMARK OFFICE
Donald W. Banner, *Commissioner*